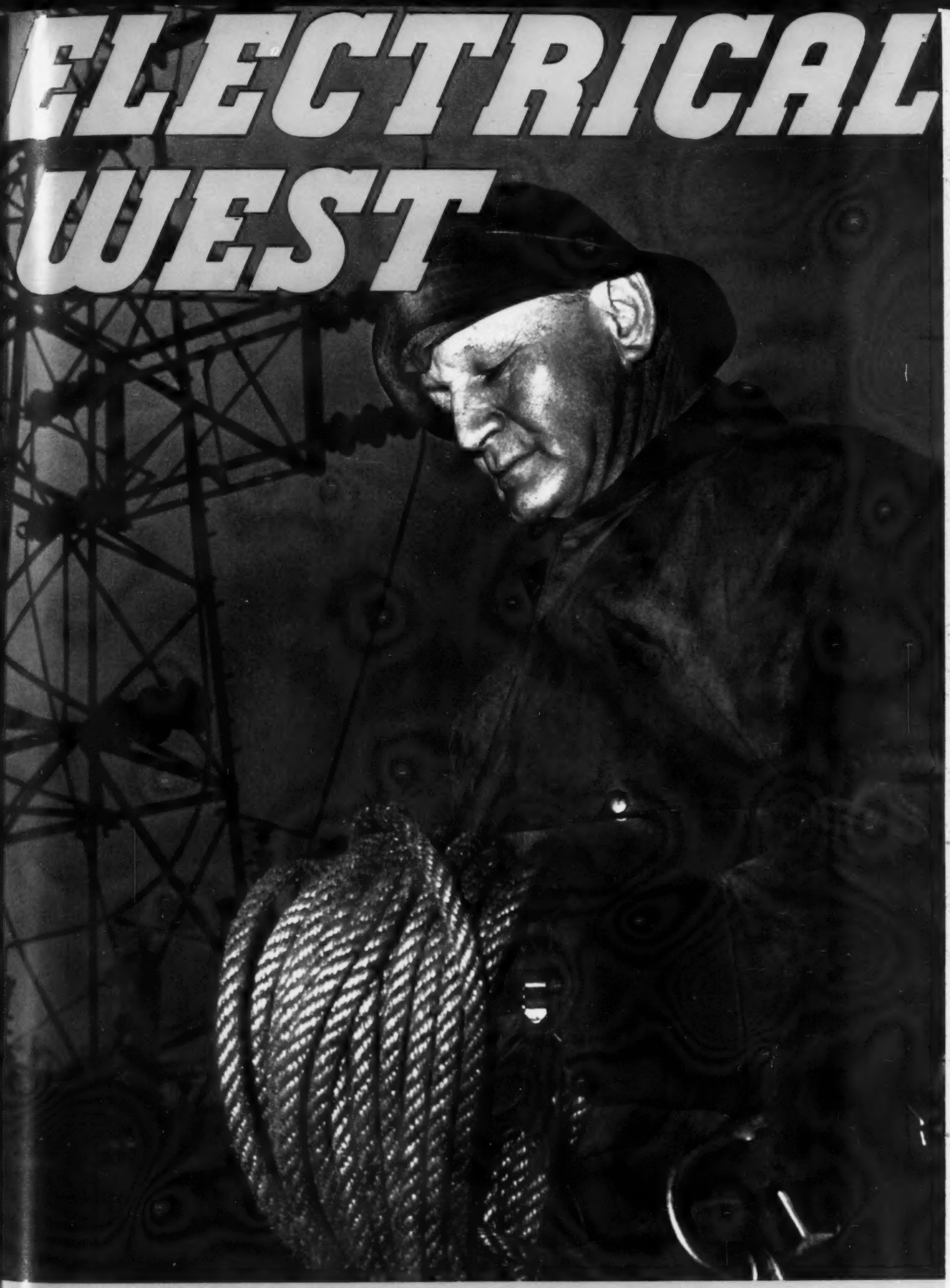
ELECTRICAL WEST



14th Annual Convention-in-Print June 1946 25c

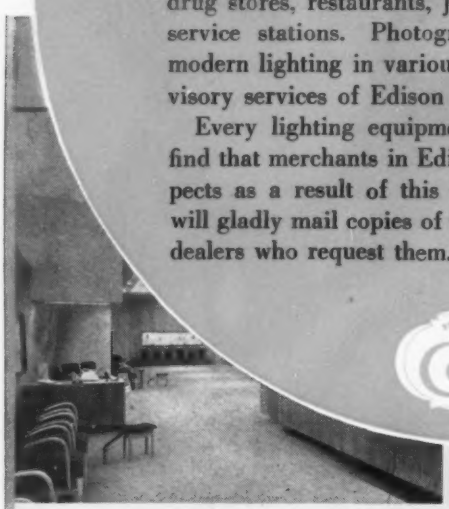
Too important for guesswork...
"IS IT BLUE OR GREEN?"
IGHTING IS BETTER SELLING
Lighting in Your Store?
through the eye. Recent years have
ought immense advances in the science
hting—progressive merchants every-
are taking full advantage of them.
Taking full advantage of the sales
modern lighting in your store
ou? . . .
STORE LIGHTING . . .

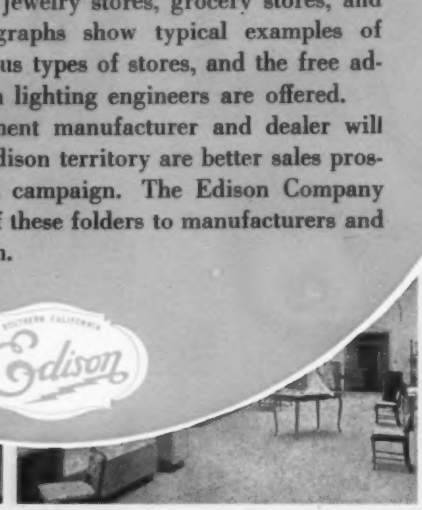
Better Business

THROUGH BETTER LIGHTING

The Southern California Edison Company is directing an effective mail campaign, stressing the selling power of light, to merchants in Edison territory. Special folders, such as pictured here, have been prepared for apparel stores, drug stores, restaurants, jewelry stores, grocery stores, and service stations. Photographs show typical examples of modern lighting in various types of stores, and the free advisory services of Edison lighting engineers are offered.

Every lighting equipment manufacturer and dealer will find that merchants in Edison territory are better sales prospects as a result of this campaign. The Edison Company will gladly mail copies of these folders to manufacturers and dealers who request them.





HAVE YOUR *Lighting* ACCURATELY MEASURED . . .

Today, store lighting is an exact science. With the aid of a light meter, a lighting engineer can measure the intensity of the light in any part of your store readily and accurately. He knows what the maximum lighting should be to produce maximum sales, based upon the experience of hundreds of successful merchants in many lines of business. Development of the new fluorescent tubes, improvement in incandescent lamps, today make possible twice the light of twenty years ago *at no added cost for current.* Have your store lighting scientifically tested—be SURE you are making *full* use of light as a selling force.

SOUTHERN CALIFORNIA EDISON COMPANY

"Good lighting is a must for successful retail selling!"

MR. DAN J. SULLIVAN

FREE LIGHTING CHECK-UP . . .

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), June, 1946. Vol. 96, No. 6. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, 4, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rates—U.S., U.S. Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $4, 2 years; $5, 3 years. Other countries: $3, 1 year; $5, 2 years; $6, 3 years. Single copy, 25c. Copyright, 1946. McGraw-Hill Company of California. All rights reserved.

"THE HANDIEST TESTING INSTRUMENT WE'VE EVER HAD"

say hundreds of users

MEASURES BOTH

VOLTS AND AMPERES

(ACCURACY 3%)

G-E HOOK-ON VOLT-AMMETER

You get double value from this handy, portable, a-c instrument. It will measure up to 600 volts and up to 600 amps. Just hook it around the conductor, push to close the gap, and read the current. Leads are provided for voltage measurements. Booklet GEA-2950 gives complete details, prices, and many helpful suggestions for operating this versatile instrument. Ask your G-E representative or write General Electric Company, Schenectady 5, New York.

HEADQUARTERS FOR MEASUREMENT

GENERAL ELECTRIC

602-94-6200

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Cover Photo by Don Krogh, Pacific Gas and Electric Co.

CHANGE OF ADDRESS

Circulation Manager,
Electrical West,
68 Post St.
San Francisco 4, Calif.

Please change my address

From .....

To .....

Signed .....

This Issue

is a convention-in-print, one without the trouble of travel and hotel difficulties. Regretfully it is without the entertainment features too. But for the man or woman in this industry who wants the chance to read, digest and think over messages of vital importance to all, this issue provides the real meat of a convention.

Because people and their difficulties in readjustment after a disruptive war will either hinder longer the return to peaceful pursuit or hasten them by their actions in the next few months, it is appropriate that the theme of this convention and all of its addresses be that of "getting along with people".

Many phases will be covered, some old, some fresh, but all requiring thoughtful consideration.

So enjoy this convention from your easy chair or your desk. In a day of high costs of hotels and travel it is the most inexpensive convention of them all for you to attend.

Next Month

will bring, almost as a sequel, a condensed notebook of thoughts, ideas, news and impressions gathered for you by a trained staff of note takers and appraisers, the editors of this ELECTRICAL WEST, from the Pacific Coast Electrical Assn. convention in San Francisco, June 12-14. Even those who actually attend will find these reports a handy reference.

Everybody's No. 1 problem will be subjected to the keen scrutiny of a famous scientist in the paper, "The Future of Atomic Energy," by Dr. J. Robert Oppenheimer, lately returned from the Manhattan project to the University of California.

In addition to these two "specials"—the Convention and the Oppenheimer paper—will be the usual departments, where the unique adequate wiring show in Idaho Power Co. territory will have top billing. Views of an editor who saw dealers in Idaho, Colorado, Utah and Montana will be entertainingly told and will contain much in the way of ideas both for keeping afloat with no merchandise and for selling with less margin.

For more than 30 years, the name "Copperweld" has been the mark of copper-covered steel wire made by Copperweld Steel Company's exclusive Molten-Welding process. And—because Copperweld products have proved their dependability and economy throughout this long period—the following facts are vitally important to you:

1. COPPERWELD is the only wire made by the Molten-Welding process—in which a thick covering of protective copper is permanently and continuously welded to a core of strong alloy steel. The perfect interlocking of these two metals, accomplished only by molten-welding, provides rugged strength, high conductivity, rust-resistance and long life.

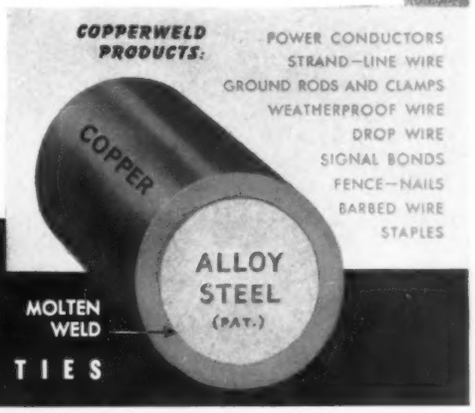
2. The name COPPERWELD is a registered trademark of the Copperweld Steel Company.

3. Only Copperweld Steel Company makes COPPERWELD. Only Copperweld Steel Company sells and licenses others to fabricate and sell Copperweld-Copper composite conductors. These licensees are Anaconda Wire & Cable Company, Kennecott Wire & Cable Company, Phelps Dodge Copper Products Corporation, and John A. Roebling's Sons Company.

4. The name COPPERWELD should be used only when referring to copper-covered steel wire made by the Molten-Welding process.

5. The name COPPERWELD should never be used when referring to any other type of copper-covered steel wire—for example—wire having copper merely plated on steel.

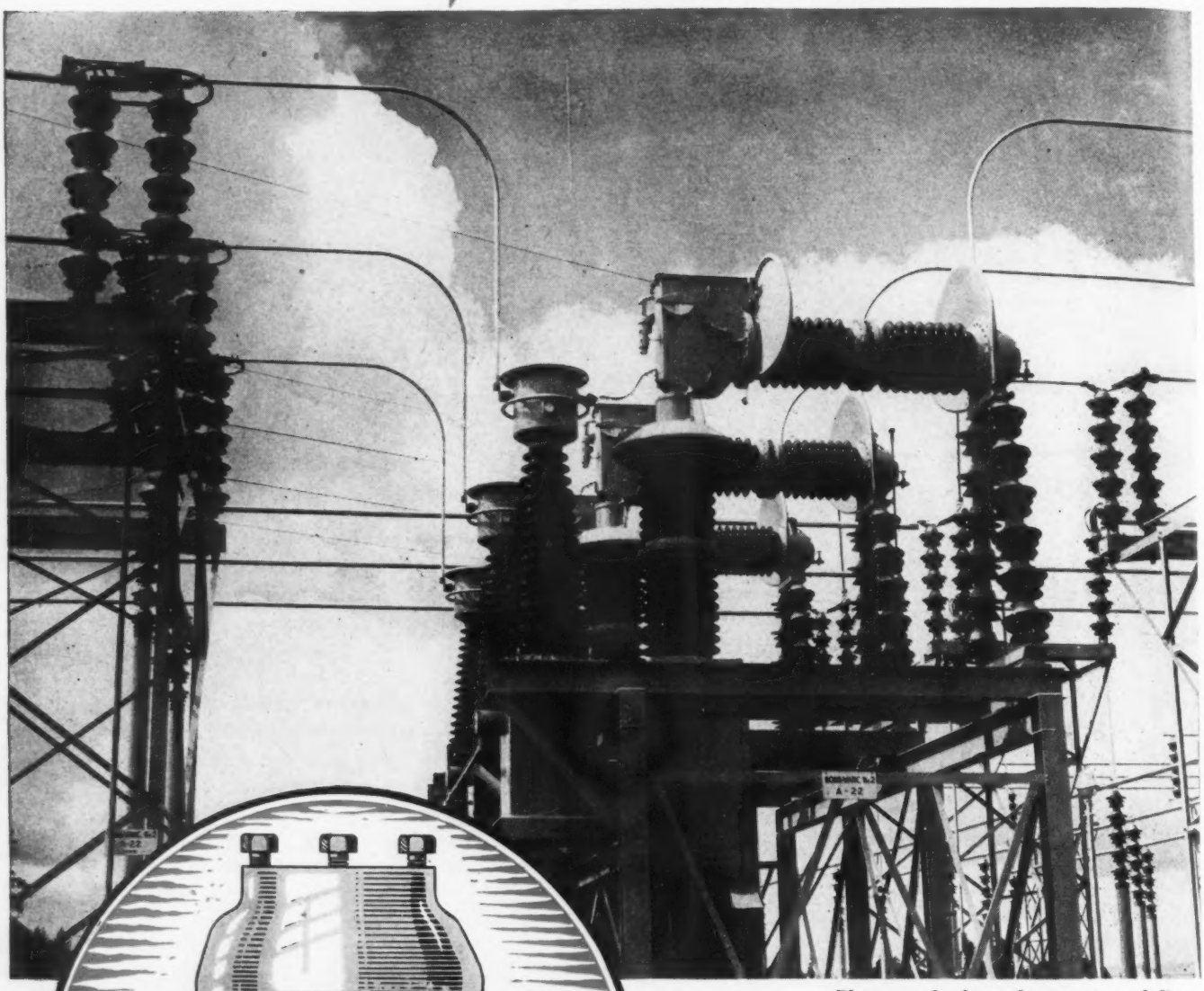
All those familiar with the many unique advantages which only Copperweld can offer, will see in these statements our sincere desire to protect every user. When your specifications or purchase orders call for Copperweld, make certain that you get Copperweld quality by actually seeing the name "Copperweld" on the product itself or on the tag accompanying every coil and reel.



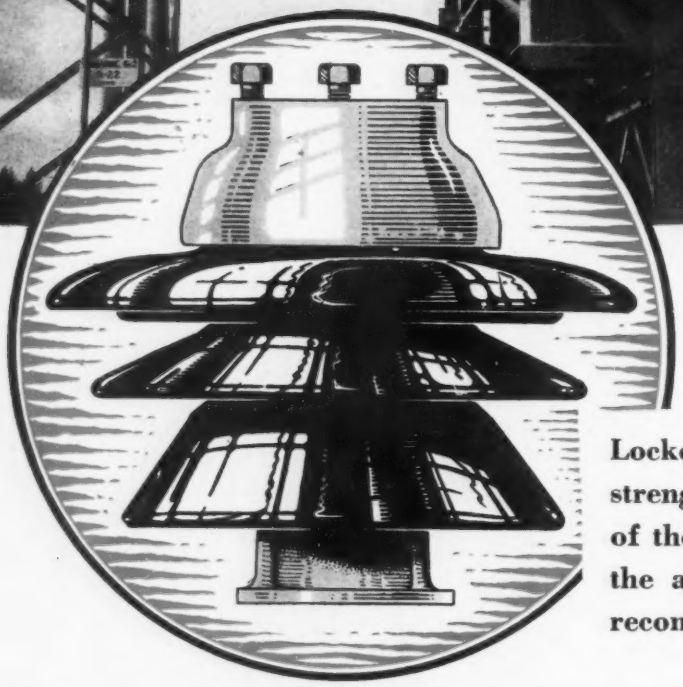
COPPERWELD STEEL COMPANY
GLASSPORT, PA.
SALES OFFICES IN PRINCIPAL CITIES

Pacific Coast Office: Rialto Building, San Francisco, California

✓ FOR MAXIMUM



Photograph through courtesy of Bonneville Power Administration.



Locke No. 7785, the original high strength switch type insulator. More of these units have been installed for the applications for which they are recommended than any other unit.

ORIGINATOR AND LARGEST MANUFACTURER OF WET-PROCESS PORCELAIN INSULATORS

LOCKE *Insulator*

FACTORS OF SAFETY....

BOTH MECHANICAL AND ELECTRICAL

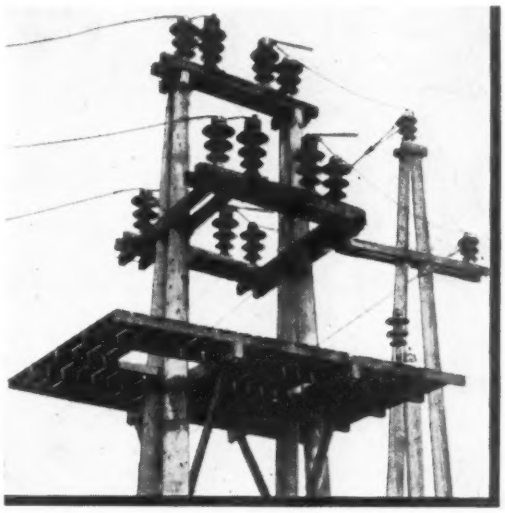
Specify LOCKE SWITCH-TYPE INSULATORS . . .

Locke switch type insulators have been standard for generations on many of the most important systems of the world because time has proved their superiority.

Today, more than ever, the name Locke on your switch insulator means longer, more satisfactory service because:

1. **The patented Locke compression glazing increases the resistance to damage from mechanical impacts and immunity to thermal shock.**
2. **The patented Locke compression sand—used in all assembly zones—improves the uniformity and stability of the unit and permits high working or transient loads.**
3. **The rugged design makes handling easier and construction quicker with less danger of breakage during installation or maintenance.**

All apparatus manufacturers will be glad to furnish these more reliable Locke switch insulators.



Locke switch insulators—vintage 1907

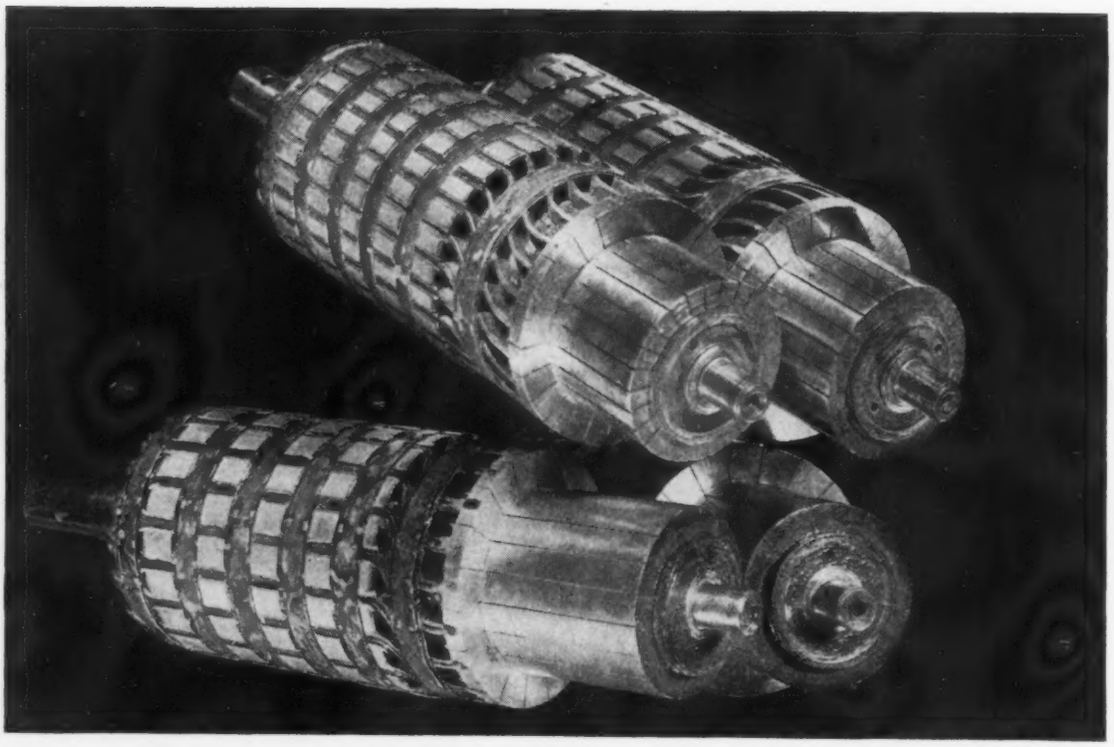
FIFTY PROGRESSIVE YEARS OF SERVICE TO THE ELECTRICAL INDUSTRY

Corporation BALTIMORE MARYLAND

A-C'S BULLETIN BOARD

★ POWER USE NEWS ★

Induction Heating Makes Better Motor Armatures



ON ENGINE STARTING motor armatures shown above, insulation might be severely damaged by ordinary brazing methods. The damage would result from long-time heating required to braze joints between coil and commutator bars.

Use of induction heating, on the other hand, easily confines heat to the joint area without prolonged treatment. Induction brazing of individual segments requires only 15-20 seconds. Results show armatures superior both electrically and mechanically!

Induction heating demonstrates how *increased use of electrical power helps industry make things better, quicker, cheaper — furthers American good living.* Allis-Chalmers offers both vacuum tube equipment (electronic heaters) for high frequency induction heating, and electronic mercury arc converters for economical heating at the lower frequencies. Write today for newest bulletins.

A 2026

ALLIS-CHALMERS

ON ELECTRICAL POWER

★ POWER SUPPLY NEWS ★

Weatherproof "Unitop" Protects Oil Breakers

WHAT IT IS: The weatherproof "Unitop" is a sealed, fabricated one-piece top frame, common to all three poles of the Allis-Chalmers type FZO-150 outdoor oil circuit breaker (high voltage, frame mounted, quick-clearing . . . furnished solenoid, solenoid-rectifier, or pneumatically operated.)

HOW YOU BENEFIT FROM "UNITOP" CONSTRUCTION:

1) A SINGLE top frame supports all six insulator bushings, as well as effecting gas and oil tight seals between pole sections, and between pole sections and control cabinet.

2) COMBINED with supporting steel frame-work, it is designed to withstand easily all stresses imposed by breaker operation at maximum interrupting rating.

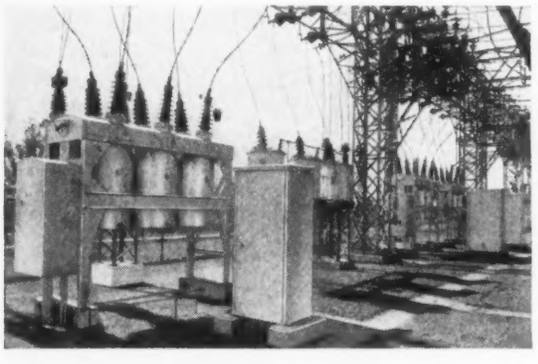
3) COMPLETELY SMOOTH exterior surface of "Unitop" has no crevices to collect dirt and invite corrosion. It offers full protection against wind-driven sand, snow, sleet and rain.

4) MOST COMPACT arrangement of pole-unit mechanisms, oil and gas separators, fill valves, bushing current transformers, terminal blocks, and conduit ducts is obtained.

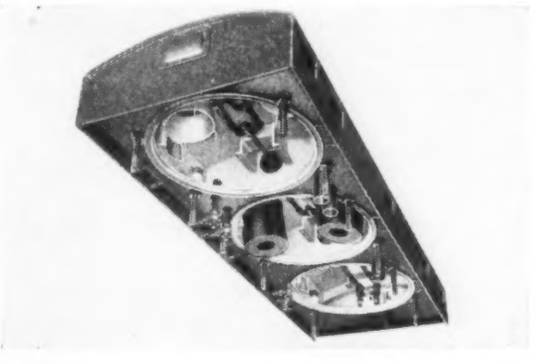
5) BUSHING CURRENT transformers, mounted in removable steel wells, are bolted to the underside of the "Unitop" frame . . . can be removed without disturbing bushings. Built-in terminal blocks for each current transformer are mounted in weather-sealed outlet chambers, and are readily accessible. Tap changing is facilitated.

6) EASILY OPERATED, portable tank lifter may be applied at the rear of the frame. Framework construction allows removal of oil tanks, when lowered, without disturbing any part of framework.

Allis-Chalmers builds oil circuit breakers in all preferred ASA standard ratings. For complete information about A-C outdoor oil circuit breakers, call our nearby sales office, or write directly to ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

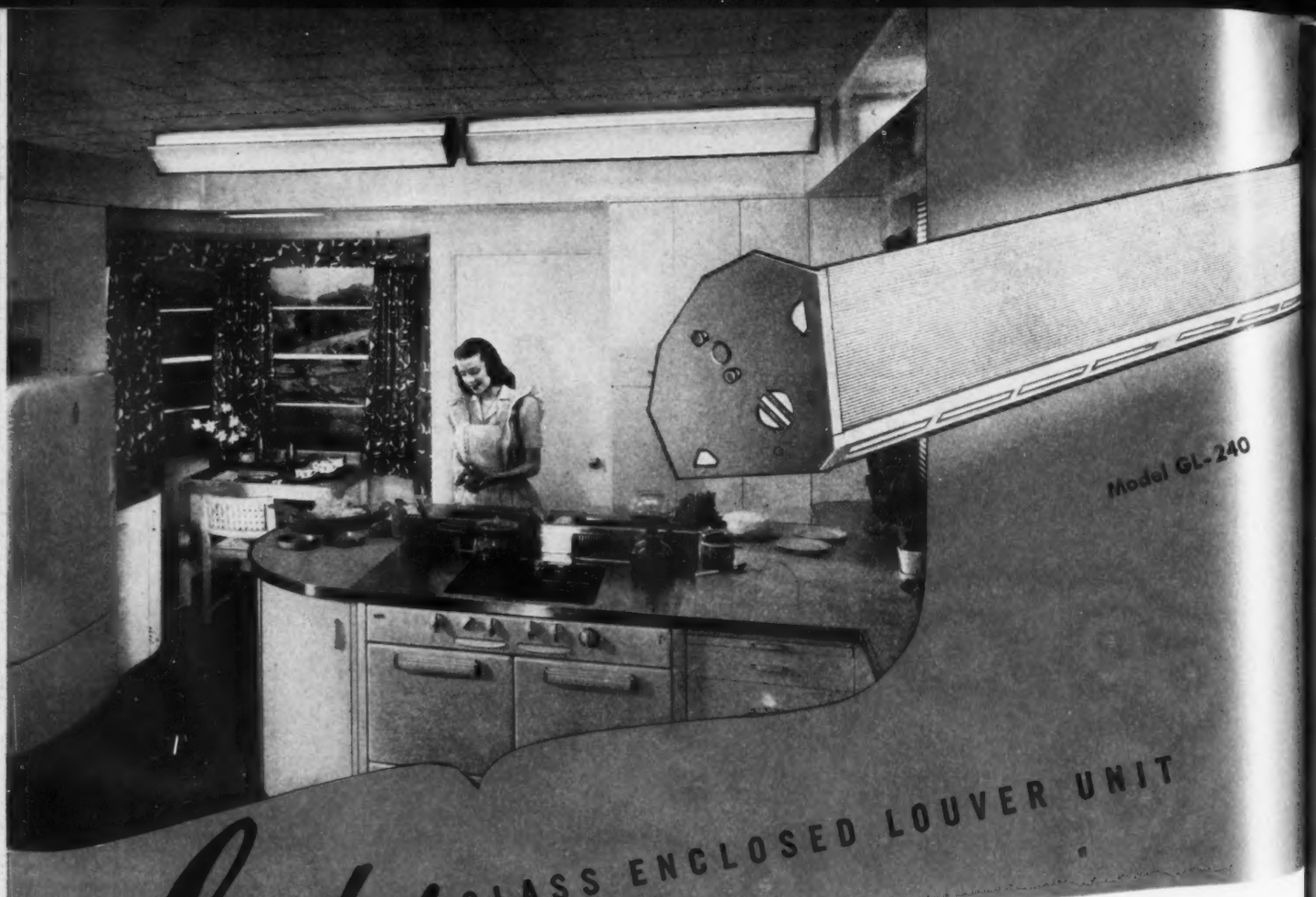


SEALED UNITOP design gives a modern, streamlined appearance to these Allis-Chalmers outdoor oil circuit breakers.



PARTIAL ASSEMBLY of the "Unitop" frame for a Type FZO-150-46 outdoor oil circuit breaker shows rigid construction.

A-C **Milwaukee 1, Wis.**



Leader GLASS ENCLOSED LOUVER UNIT

FOR THE MODERN KITCHEN..

...A Housewife's Dream Come True!

for the work

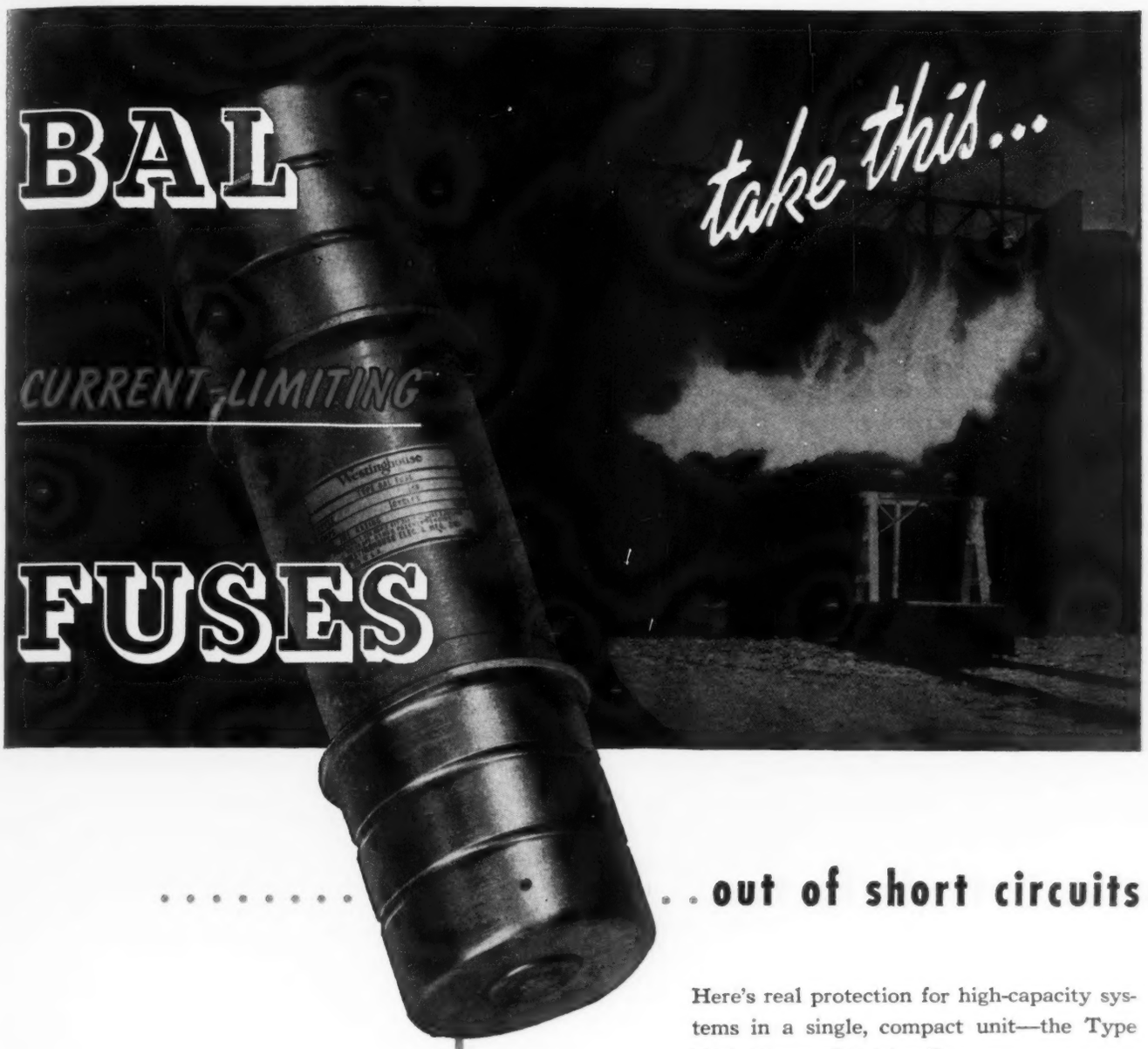
for the play

American homemakers want light in their kitchens—lots of it,
And Leader's Glass Enclosed Louver Unit (model GL-240) gives 'em
what they want. Ideal for other installations, too. In playrooms,
workshops, in fact, in any room, this modern two light fixture
will add grace and charm to its surroundings.
Leader fixtures are distributed only by better electrical wholesalers.
There is a Leader Representative in your area. See him today, or write

LEADER ELECTRIC MANUFACTURING COR

6127 NORTH BROADWAY • CHICAGO 40, ILLINOI

WEST COAST FACTORY — 2040 LIVINGSTON STREET • OAKLAND CALIFORNI



. . . . . out of short circuits

Here's real protection for high-capacity systems in a single, compact unit—the Type BAL Current-Limiting Fuse.

It not only provides positive interruption of fault currents, but its extremely fast operation limits high short-circuit currents to a fraction of their normal value. Surge voltages are held to a value which is safe for the system's insulation.

Only a hookstick is required for inserting, removing or operating the fuse. All ratings are handled in single-tube elements, so stock problems are simplified. An easy-to-see indicator quickly spots blown fuses.

Get additional application information. Write for booklet B-3430. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60585-A

LATEST ADDITION TO THE

BORIC ACID FUSE LINE

1. **LIMITS SHORT-CIRCUIT CURRENTS.** By preventing short-circuit currents from reaching their maximum value, the BAL Current-Limiting Fuse provides greater protective capacity for both connected apparatus and feeder system. Also controls surge voltage during interruption to safe values.

2. **INTERRUPTS HIGH-CURRENT FAULTS IN .008 SECONDS.** Limits and interrupts faults on circuits capable of delivering up to 80,000 amperes at 7500 volts. Limits short-circuit current on high-capacity systems for such applications as power transformers and high-voltage motor starters. Gives adequate protection for installations close to generating source.

3. **SILENT, FLAMELESS OPERATION.**

4. **SINGLE TUBE ELEMENT FITS ALL RATINGS.**

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

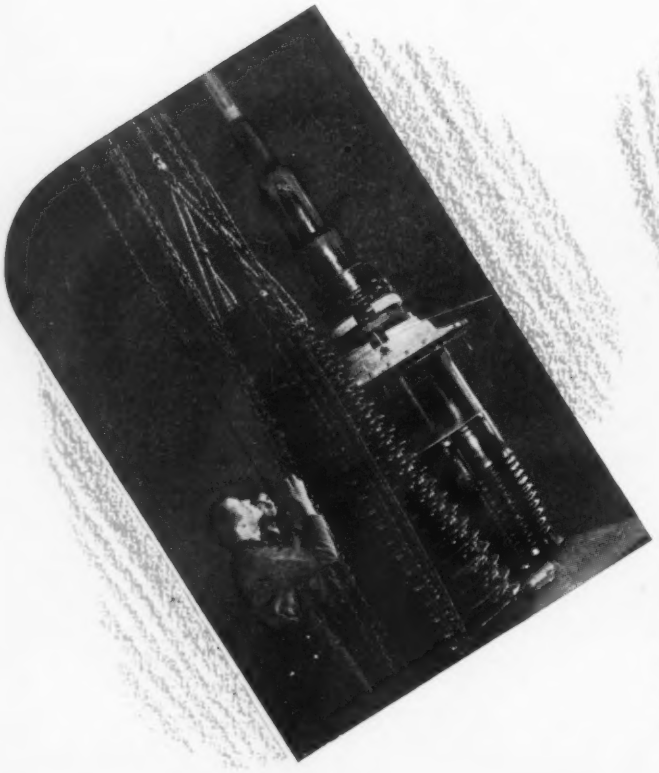
TYPE BAL *CURRENT-LIMITING* FUSES

Correct to Start With --and Stays That Way

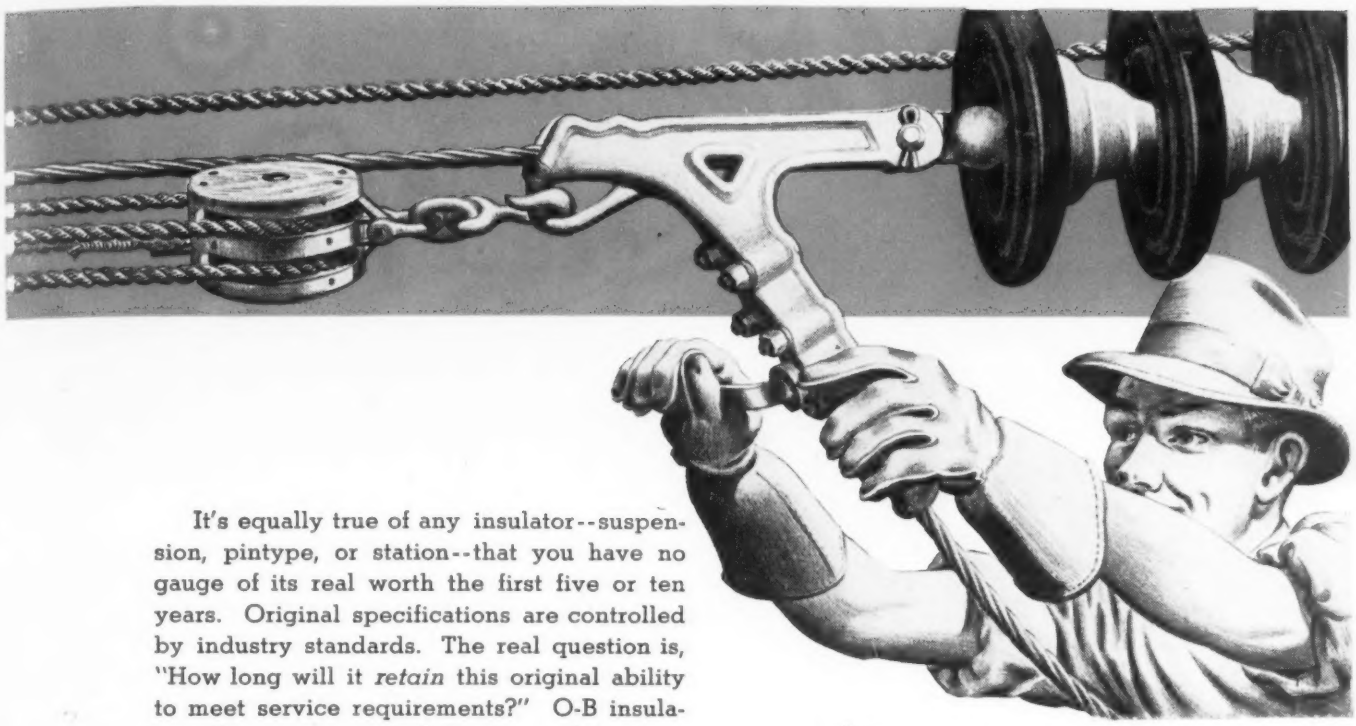
DOES HARDWARE ever loose its strength? Yes! Here's how--if corrosion attacks it, every cross section is slowly but surely reduced. Metal put there for a safety factor disappears, and so does that safety factor. Then we begin losing that margin of strength we *know* we need, until some unusual stress exceeds the capacity of the remaining metal. This, in short, is the story of corrosion. Regardless of design or any other advantage, if the metal itself isn't durable, neither will be the service that piece is supposed to render.

O-B high-voltage hardware is cast in malleable iron for three sound reasons. (1) It has a desirable ratio of strength, ductility, and weight. (2) Because the molten metal is highly fluid, it comes out true to mold in complex and precise shapes not attainable by other methods of fabrication. (3) due to a unique property of *cast* ferrous metals, the surface coating of rust forms a permanent natural protection that positively stops all further corrosion. Malleable iron brings you these three vital qualities. It is strong and ductile. It can be shaped to true functional design without compromises. It retains its shape, its size, and its strength because it does not corrode.

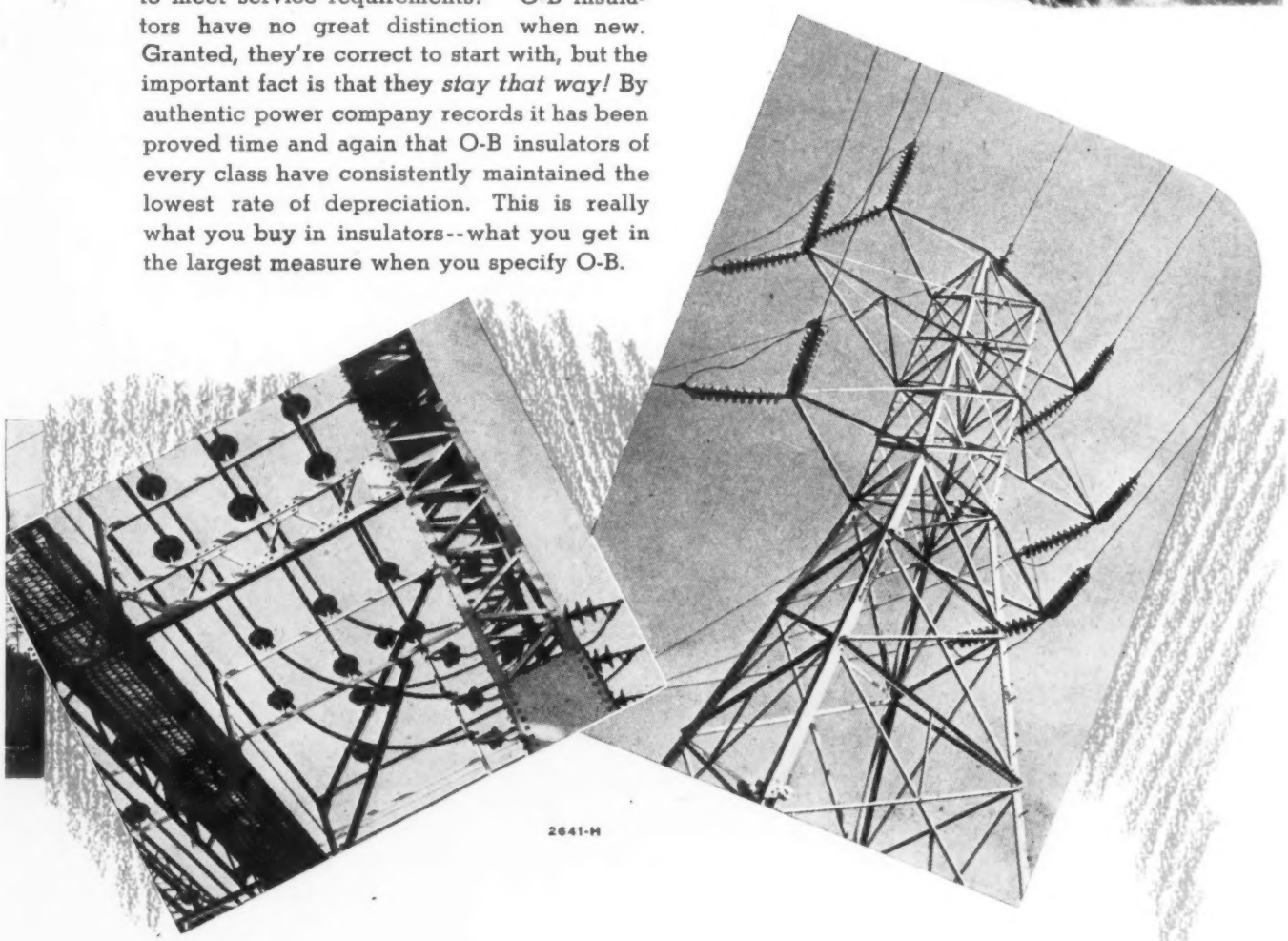
Suspending a charged conductor is basically a mechanical job, and one that must go on indefinitely. For this purpose, specify O-B line hardware that is correct to start with--and stays that way.



Again, O-B's durability shows up in bushing design. Internal dielectric is porcelain--porcelain you have learned through years of experience to trust in any high-voltage insulation job. Only with O-B bushings can you get porcelain internal dielectric and, for this same reason, only with O-B bushings can you get the long, trouble-free performance that naturally goes with porcelain insulation.



It's equally true of any insulator--suspension, pintype, or station--that you have no gauge of its real worth the first five or ten years. Original specifications are controlled by industry standards. The real question is, "How long will it *retain* this original ability to meet service requirements?" O-B insulators have no great distinction when new. Granted, they're correct to start with, but the important fact is that they *stay that way!* By authentic power company records it has been proved time and again that O-B insulators of every class have consistently maintained the lowest rate of depreciation. This is really what you buy in insulators--what you get in the largest measure when you specify O-B.



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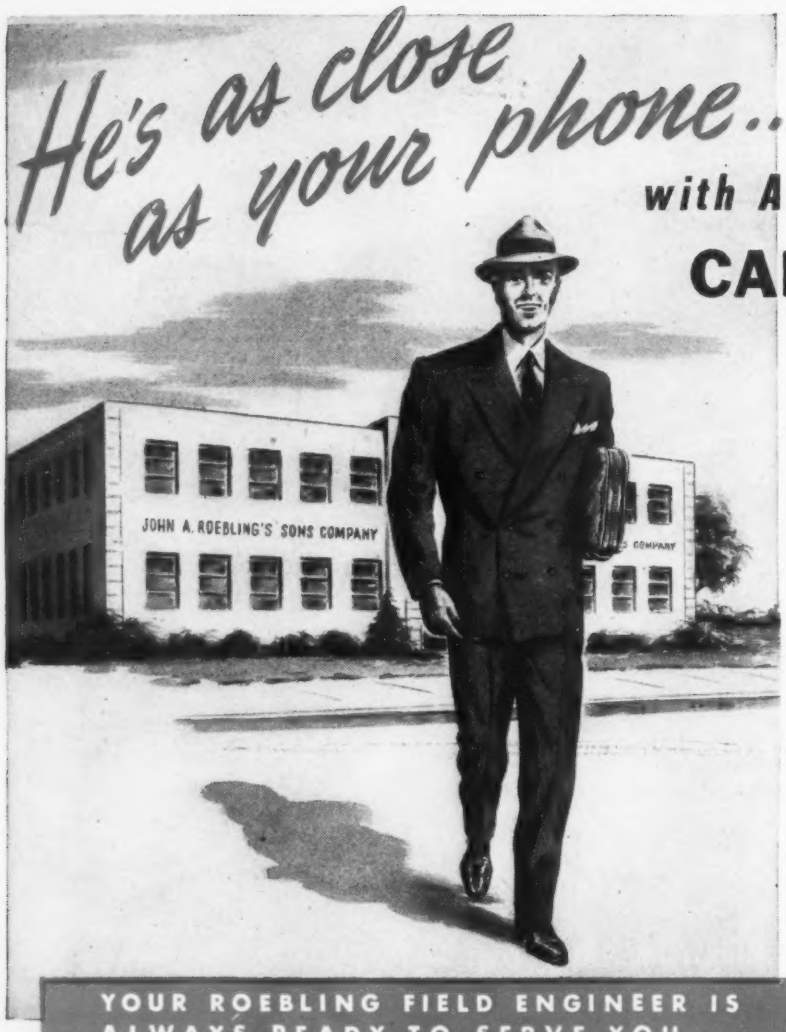
Ohio Brass

MANSFIELD, OHIO
CANADIAN OHIO BRASS COMPANY, LIMITED
NIAGARA FALLS, ONTARIO



with Answers to Many of Your CABLE PROBLEMS

IT'S AS SIMPLE AS THAT. When you're faced with a tough cable problem or wiring job, chances are you'll solve it in less time . . . with less trouble . . . by phoning your nearest Roebling branch office.

A Roebling field engineer is well qualified to analyze and advise on unusual wiring needs. He can tell you what performance to expect of each type wire or cable . . . what's available right now . . . what's likely to be on hand soon . . . what can be specifically recommended to meet the operating conditions.

Maybe he can even answer your problem by phone. But in any event, he's always ready to come out to the job and offer helpful suggestions first-hand. Add his specialized knowledge of wires and cables to *your* knowledge of the job's requirements . . . and the result is a simple short-cut to long, efficient cable performance.

Roebling field engineering service is *dependable* . . . and doesn't end with an order. Ask us about it.

JOHN A. ROEBLING'S SONS COMPANY OF CALIFORNIA

San Francisco • Los Angeles • Seattle • Portland

YOUR ROEBLING FIELD ENGINEER IS ALWAYS READY TO SERVE YOU . . .

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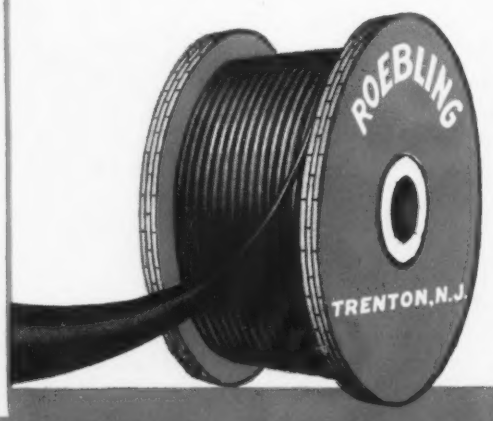
Seattle 4, Wash.	900 First Avenue, South—*Main 4992*

KEEP THIS INFORMATION HANDY FOR FURTHER REFERENCE



ROEBLING

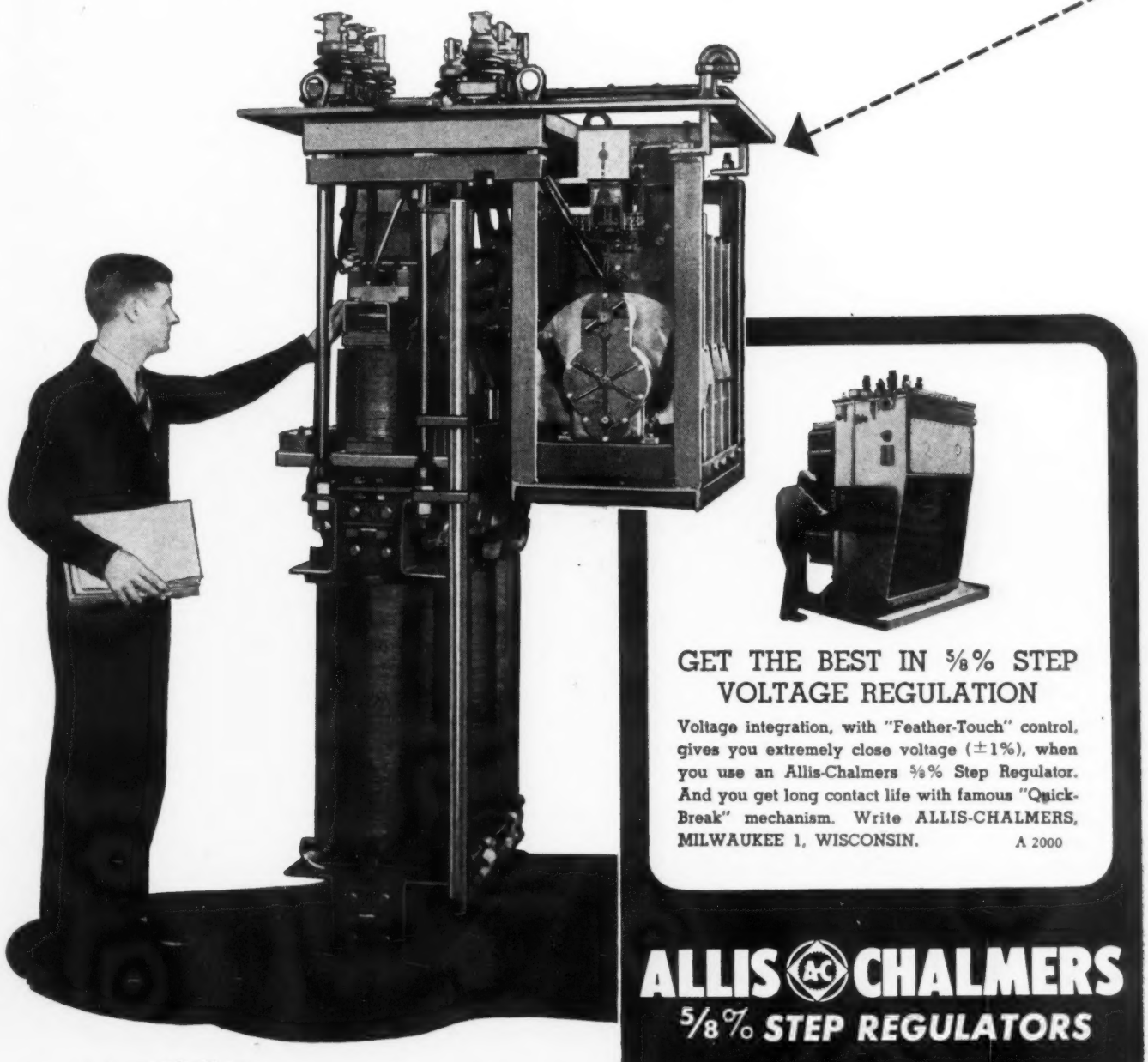
ELECTRICAL WIRES AND CABLES

Weatherproof Wire • Service Entrance Cables • Rubber-Covered Wires and Cables (Including Small Diameter Building Wires and Cables) Rubber Sheathed Portable Cables • Rubber Insulated Power Cables • Magnet Wire • Telephone Wires • Pigtail and Braided Copper • Trolley Contact Wire • Bare Copper Strand • Varnished Cambric Power Cables.

UNIT CONSTRUCTION OF REGULATORS MEANS

Thorough Inspection

With unit type construction, featured in Allis-Chalmers ⅝% Step Regulators, both transformer and tap-changing mechanism are cover-suspended. Thus, all parts are readily accessible for careful factory inspection, just before the unit is tanked . . . your assurance of a well-made voltage regulator! Unit construction means elimination of 78 bolted connections . . . 78 fewer possible trouble spots.



GET THE BEST IN ⅝% STEP VOLTAGE REGULATION

Voltage integration, with "Feather-Touch" control, gives you extremely close voltage (±1%), when you use an Allis-Chalmers ⅝% Step Regulator. And you get long contact life with famous "Quick-Break" mechanism. Write ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2000

ALLIS CHALMERS

⅝% STEP REGULATORS

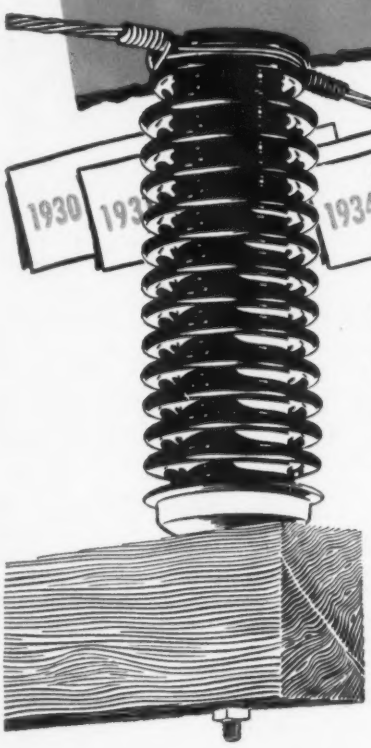
BURNDY Scrulugs

NOW AVAILABLE IN
SIZES UP TO 500 MCM

BURNDY ENGINEERING CO., INC., 107-V BRUCKNER BLVD., N. Y. 54, N. Y.

LINE POST LINES ARE PERMANENTLY RADIO-FREE

In the days when complaints of radio interference constituted the number-one headache to Customer Relations and Transmission Engineering departments, the Lapp Post series of insulators offered the first completely satisfying answer. Radio-free by design—corona cannot form at rated operating voltages and well beyond —Line Posts and Station Posts provide permanent and complete elimination of insulator-generated radio noise.

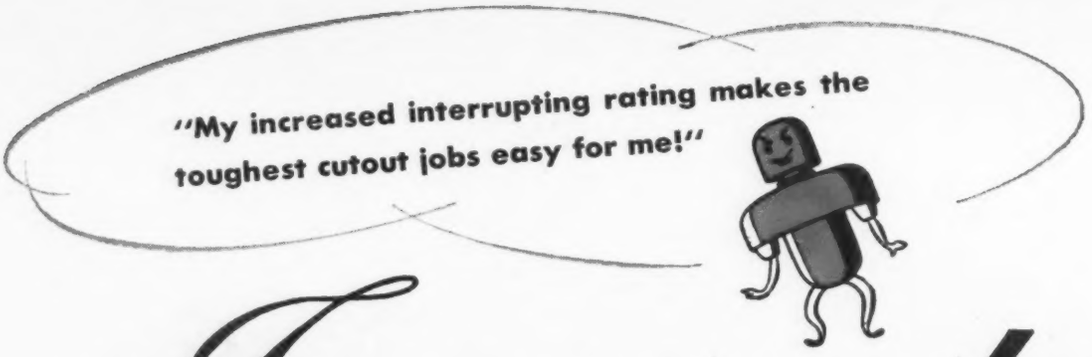


LAPP LINE POSTS HAVE A 15-YEAR SERVICE RECORD

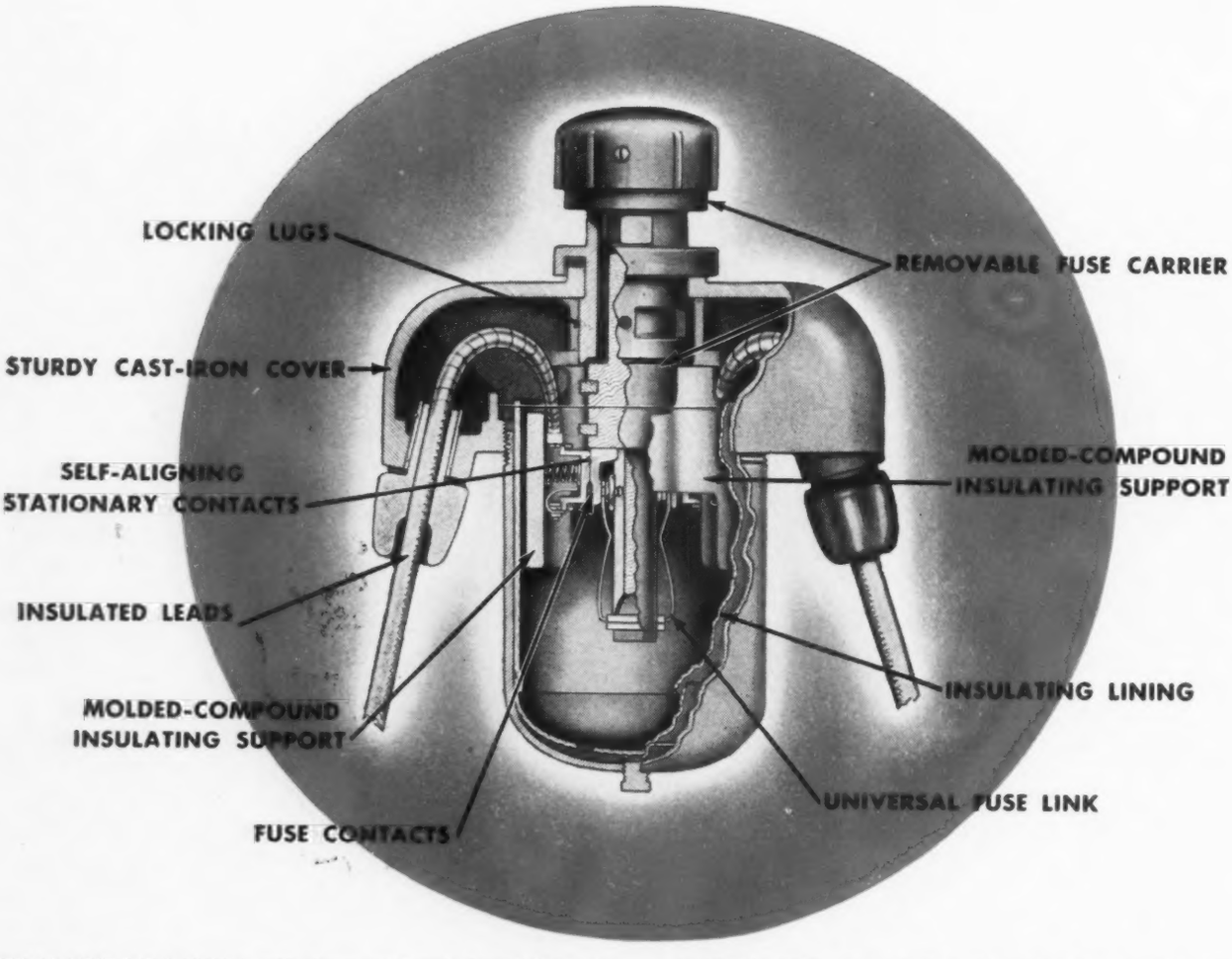
The first shipment of Lapp Line Posts went into service 15 years ago. The installation was the one which had inspired The Line Post design—a particularly bad, and previously unsolved, dirt condition. Since then, hundreds of thousands of Lapp Posts have gone up, in many cases a desperation answer to a difficult service problem—dirt condition, mechanical attack, radio noise, arcover failure. And the 15-year service record of these insulators shows them to stand up better, with fewer line outages, and lower replacement ratio, than any other insulator now in use.

Lapp

LAPP INSULATOR COMPANY, INC., LE ROY, N. Y.



Improved G-E



STURDY CAST-IRON COVER with drawn-steel tank threaded in—designed for safety, to withstand much higher internal pressures than can occur within the cutout's interrupting rating.

INSULATING LINING on sides and bottom of steel tank.

MOLDED-COMPOUND INSULATING SUPPORT bolted to inside of cast-iron cover provides firm foundation for the two stationary contacts.

SELF-ALIGNING STATIONARY CONTACTS are flexibly mounted and bear against fuse contacts with strong spring pressure.

REMOVABLE FUSE CARRIER of oil-treated wood with strong metal cap—lifts vertically out of small opening in cover for easy fuse renewal.

LOCKING LUGS automatically hold and seal fuse carrier securely in the cutout, except when carrier is rotated to full open position. Cutout is therefore always ready for switching.

FUSE CONTACTS—rigidly mounted on fuse-carrier plug—have clamp-type terminals which support the fuse link.

UNIVERSAL FUSE LINK fits into notch provided in fuse-carrier plug. Note: Notch can be sawed in plugs of earlier cutouts to accommodate these new links.

INSULATED LEADS are siphon proof and enter the cutout above the oil level, through wet-process porcelain bushings.

Uses New, *Universal* Fuse Link — Has *New* Design Features — FOR BETTER PROTECTION, GREATER ACCURACY, LONGER CONTACT LIFE

OIL FUSE CUTOUT

"I'm built to deliver more circuit protection than ever," says this improved G-E fuse cutout. "With my new, universal fuse link, I have higher short-circuit interrupting capacity—can safely clear fault currents up to 11,000 amperes (depending upon my rating)—under circuit conditions tougher than fuse cutouts ever meet in service."

THE Textolite insulating support is stronger, gives higher flash-over level, and provides a more solid foundation for stationary contacts. These features add greater interrupting ability.

The contacts are designed to confine all arcing, when the circuit is opened, to special arcing surfaces well under the oil, keeping the load-carrying contact surfaces permanently clean. This permits repeated switching of load current —with either disconnecting blades or fuse links.

UNIVERSAL FUSE LINKS—an entirely new feature—replace earlier plain and reactive-type links. They can be used in the improved G-E cutout—and in older types too—with price savings of as much as 40 per cent over the superseded plain-type links, and even more, over the reactive type. These new universal fuse links reduce the number of items required in stock—one line of *universal* ratings is now applicable to 100-, 200-, and 300-ampere cutouts.

USE G-E OIL FUSE CUTOUTS where you require:

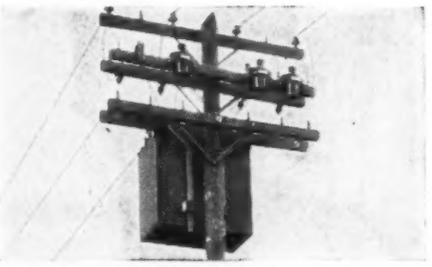
1. High interrupting capacity
2. Quiet and safe operation, with no exposed live parts and no expulsion of arc flame
3. Dependable operation when completely submerged
4. Gang operation of two or three units

NEW G-E UNIVERSAL FUSE LINKS carry **100 per cent of rated current continuously in 100-, 200-, and 300-ampere cutouts. The accuracy of their time-current characteristics equals that of G-E expulsion-type fuse links. When used in the improved cutouts, they permit higher continuous current ratings at 5000 volts, and increased interrupting ratings at all voltages. In the earlier cutouts, they permit interrupting ratings as high as the previous reactive-type links.**

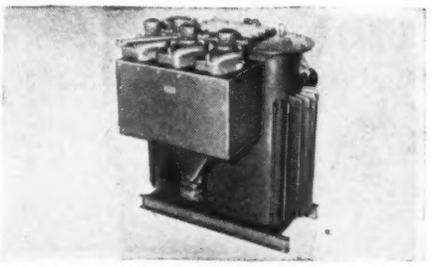
YOUR G-E REPRESENTATIVE can supply further information (HB 5350 to 54). Our descriptive booklet (GEA-732) is being revised and will be sent upon request as soon as it is completed. Address inquiries to your nearest G-E office or to General Electric, Schenectady 5, N. Y.

GENERAL ELECTRIC

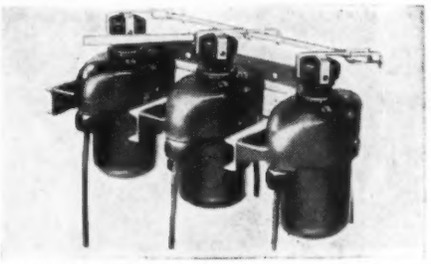
406-18-5254



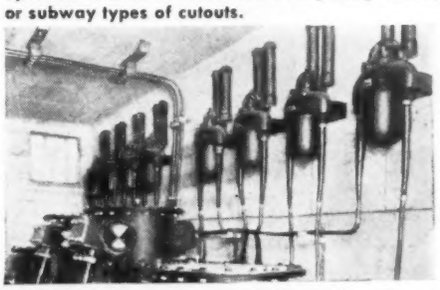
POLE-MOUNTED INSTALLATION of pole-type oil fuse cutouts. Can be used indoors or outdoors for connecting apparatus to lines or for line sectionalizing.



METAL-ENCLOSED ASSEMBLY with gang-operating mechanism—mounted directly on 3-phase transformer. Assemblies can also be separately mounted.



GANG ASSEMBLY (pole type) arranged for 3-phase operation. Mechanism available for pole, pothead, or subway types of cutouts.



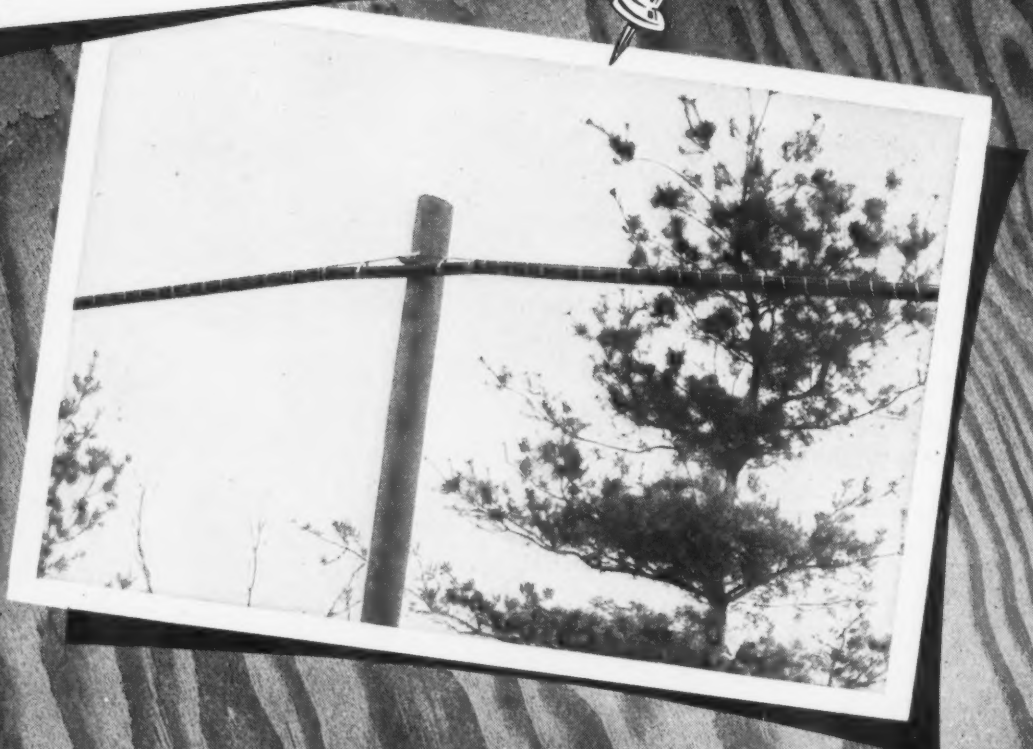
SUBWAY-TYPE oil fuse cutouts equipped with expansion chambers in underground vault. This type is advantageous for submersible or semi-hazardous locations.

Pioneers in Cable Engineering

KERITE
Self-supporting
Aerial Cables

15000 VOLTS

75000 Conductor Feet
Installed 1941



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CUTTING MAINTENANCE COSTS!

It Pays to Use a QUALITY Product

BLACKBURN Hi-Strength CONNECTORS

Millions in Use Throughout the World

BLACKBURN CONNECTORS cut costs because years of experience have proved them to be *trouble-free* on the line. That's due to their high-strength construction—of DURONZE, which is 75% stronger than hard copper or commercial bronze.

BLACKBURN CONNECTORS cut costs because they produce a *more efficient* connection. Tests show that the conductivity of the connection is actually better than the solid wire itself. This superior conductivity is retained through years of service.

BLACKBURN CONNECTORS cut costs because they *last longer*. They are made of DURONZE—which is more non-corrosive than pure copper. They will not season crack. And they will stand up in the severest elements almost indefinitely.

BLACKBURN CONNECTORS cut costs because they can be *reused* over and over again. They are the *strongest connector made*, and will not twist or distort when tightened up. Thus, when taken off, although tarnished, they are as good as new.

Over 100 Conveniently-Located Jobbers' Stocks

JASPER BLACKBURN PRODUCTS CORP.

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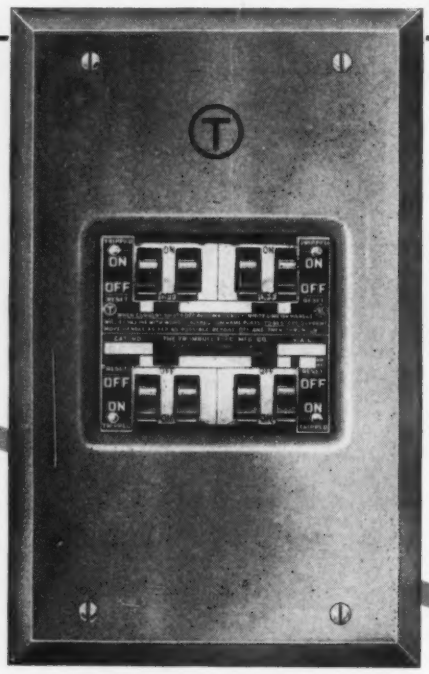
BUILDERS OF QUALITY CONNECTORS FOR OVER 10 YEARS

TRUMBULL

MULTI-BREAKER LOAD CENTERS

Fuseless

It isn't really
ADEQUATE WIRING
without modern
MULTI-BREAKER PROTECTION

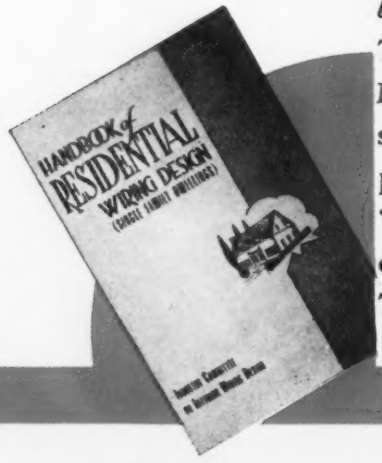


ADEQUATE WIRING — THE KEY TO THE HOME OF TOMORROW — SERVES AND SAVES

Why? Because the Adequate Wiring Program covers a lot more ground than just an ample capacity in the main service cables, plenty of circuits, wall switches and outlets.

Trumbull Multi-Breakers . . . proven by more than a million circuits already in use for residential protection . . . further all these aims . . . but *add one big advantage;* they save the cost and inconvenience of service calls. There are NO FUSES TO RENEW, nothing to replace when a Multi-Breaker "opens". Any child can "flip" the switch and restore service after the cause of trouble has been removed. And the important point is that this modern FUSELESS protection is not a "rich man's gadget". It is low enough in price to be used in minimum cost housing budgets RIGHT NOW. For full information write Trumbull today.

This new "Handbook of Residential Wiring" is available from Electrical Contractors, Wholesalers, or through your local Lighting Company. See particularly pages 16, 17 and 18.



THE TRUMBULL ELECTRIC MANUFACTURING CO.

PLAINVILLE, CONNECTICUT

OTHER FACTORIES AT

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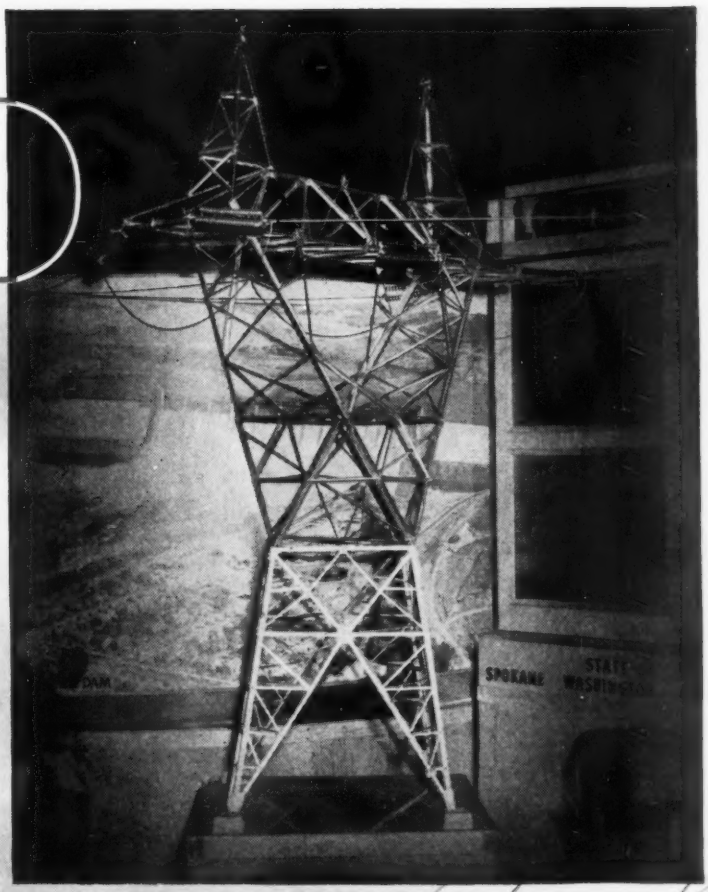
Only a miniature,

but why not ALCOA ALUMINUM in the real towers?



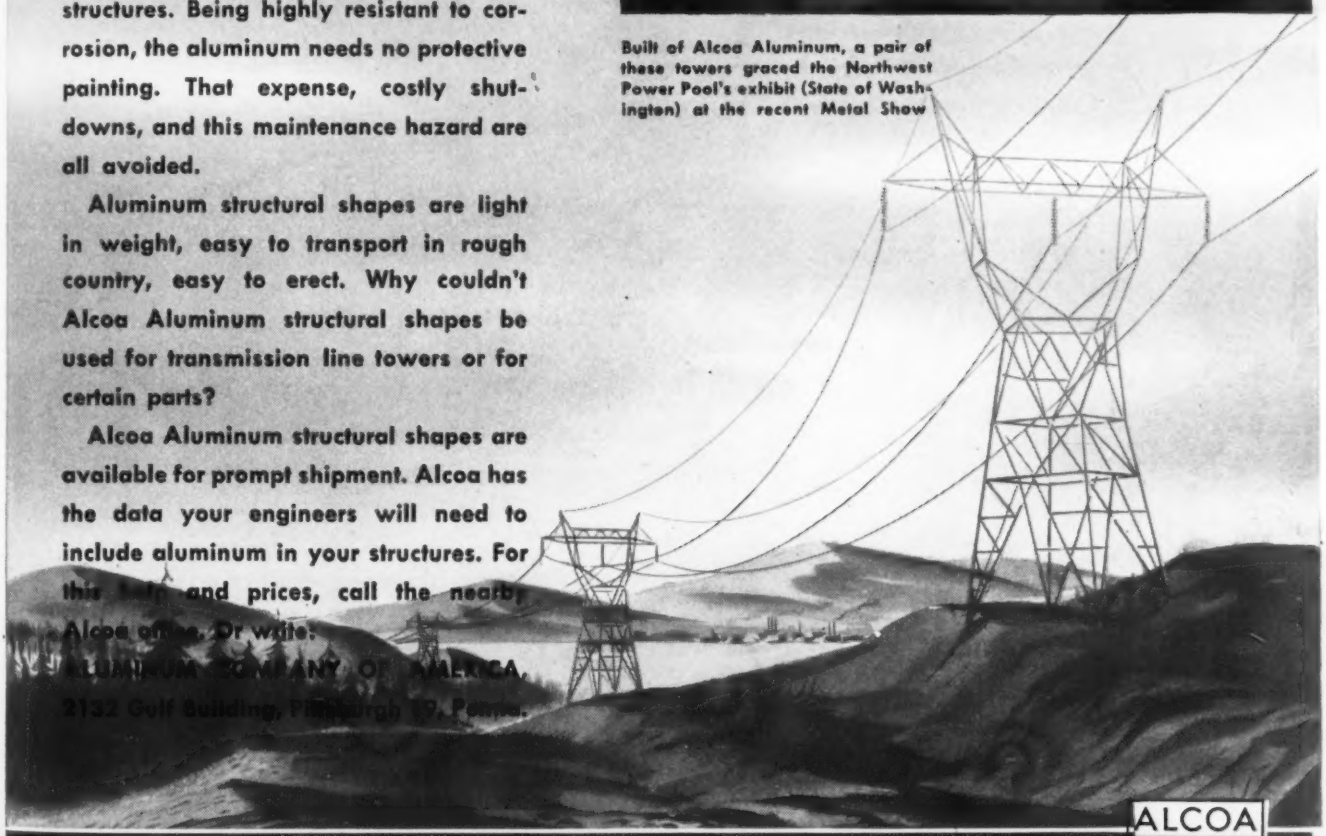
Built of Alcoa Aluminum, a pair of these towers graced the Northwest Power Pool's exhibit (State of Washington) at the recent Metal Show

Alcoa Aluminum structural shapes are being used for substations and switchyard structures, as crossarms on H-frame structures. Being highly resistant to corrosion, the aluminum needs no protective painting. That expense, costly shutdowns, and this maintenance hazard are all avoided.

Aluminum structural shapes are light in weight, easy to transport in rough country, easy to erect. Why couldn't Alcoa Aluminum structural shapes be used for transmission line towers or for certain parts?

Alcoa Aluminum structural shapes are available for prompt shipment. Alcoa has the data your engineers will need to include aluminum in your structures. For this data and prices, call the nearby Alcoa office. Or write:

ALUMINUM COMPANY OF AMERICA,
2132 Gulf Building, Pittsburgh 19, Penna.



ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

YEARS OF EXPERIENCE

There are many products in the complete Insulation Material line. Each has been developed to meet the exacting requirements of specific conditions.

General Electric is one of the world's largest and most experienced manufacturers of a wide variety of Insulation Materials. The capacity to produce vast quantities of these materials for many war applications and years of experience in research and manufacture are now available to peace industry. Strict G-E Quality Control assures uniformity of product in every shipment of Insulating Materials.

- Insulating Varnishes
- Finishing Varnishes
- Stickers
- Filling Compounds
- Sealing Compounds
- Varnish Treated Cloths
- Varnish Treated Cloth Tapes
- Insulating Fibers
- Insulating Papers
- Varnished Tubing
- Rubber Tape
- Cotton Sleeving
- Cotton Tape
- Cords and Twines
- Mica Products
- Armature Wedges
- Soldering Fluid
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- Soldering Sticks
- Core Solder
- Friction Tape
- Glyptals

Our ten Offices and Warehouses in the Western States are your best and quickest sources of information and supply for G-E Insulating Materials.

WESTERN REGION

GENERAL ELECTRIC SUPPLY CORPORATION

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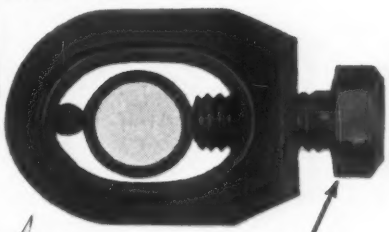
HERE'S WHY YOU GET LONGER SERVICE FROM THE NEW Reliable GROUND ROD CLAMPS

MADE IN THREE SIZES:

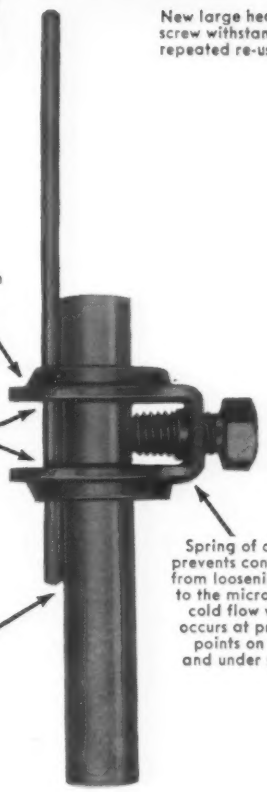


New large head screw withstands repeated re-use.

EVERDUR NON CORROSIVE MATERIAL

WRITE FOR NEW PRICE SHEET

Size of rods accommodated plainly marked on each clamp.



Embossed design permits use of highest grade material at low cost.

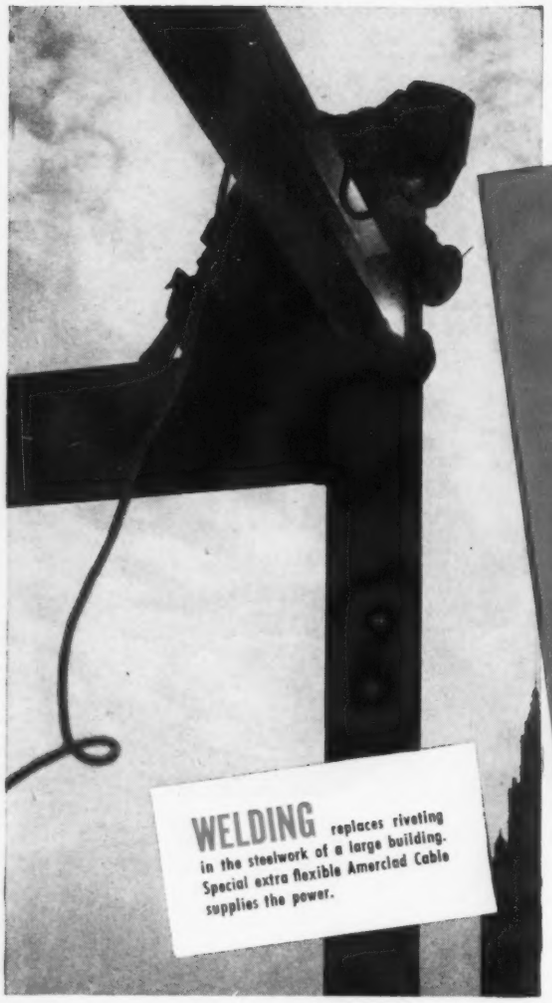
Clamp bears on wire at two high pressure points.

Spring of clamp prevents connection from loosening due to the microscopic cold flow which occurs at pressure points on wire and under screw.

Ground wire makes contact directly against rod.

Reliable ELECTRIC COMPANY
3145 CARROLL AVENUE
CHICAGO 12

OVER 35 YEARS Service TO THE UTILITIES

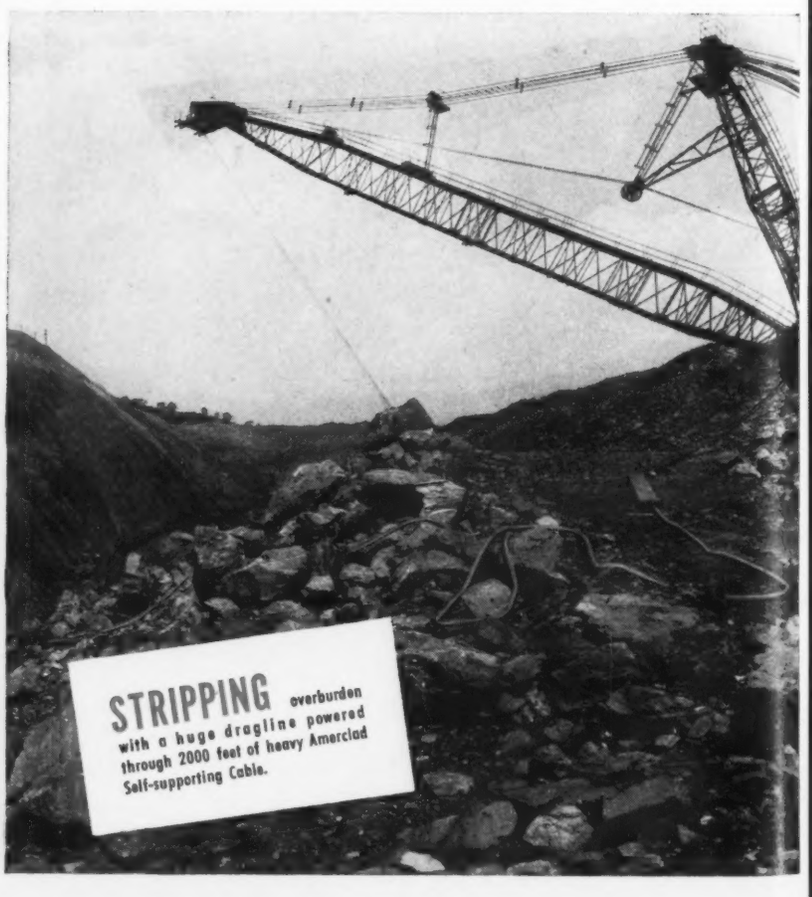


WELDING replaces riveting in the steelwork of a large building. Special extra flexible Amercled Cable supplies the power.

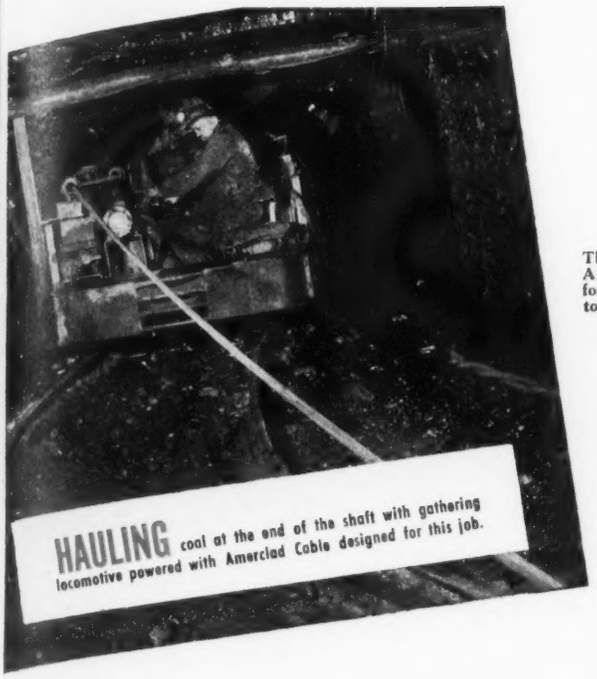
Portable electrical machines multiply man's ability to produce

... and these Better

BLASTING rock on an earth moving job. An electrically operated bore hole drill is powered through a rugged Amercled Cable.



STRIPPING overburden with a huge dragline powered through 2000 feet of heavy Amercled Self-supporting Cable.



Two conductor flat Amerclad Mining Locomotive Cable requires less space on the reel.

Three conductor portable Amerclad Cable reinforced with steel strand to give maximum strength.

Engineered U·S·S Amerclad Cables keep power flowing!

ONE man with a hand shovel is high-priced labor. But give him a thousand-horsepower electric shovel and watch your costs come tumbling down.

Hundreds of portable machines from small electric handsaws to the world's largest electric shovels are now multiplying man's ability to produce at lower costs. All of this equipment requires electrical cables that can be dragged over rough surfaces or sharp rocks, through acid waters or hung from high cliffs.

To meet these severe conditions, engineers at American Steel & Wire Company have produced better electrical cables that can take all kinds of punishment and still deliver the kilowatts. U·S·S Amerclad Portable Cable is made to withstand abuse of all kinds.

A certain contractor, for example, needed a cable that could support 200 feet of its own weight vertically and deliver 1500 kw. at the end of a half mile run. An Amerclad Cable was designed with three heavy copper conductors reinforced with three steel strands separated by the necessary insulation. The whole assembly was covered with tough tire-tread rubber so that it could be dragged anywhere. This cable has given remarkable service even though it has been run over repeatedly by heavy trucks.

If your job is different—as most of them are—let us know the conditions. Our engineers will design a cable that will give reliable service with maximum safety. Standard U·S·S Amerclad Cables are designed with the same care and built to give the most service per dollar of cost.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

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Overhead and Underground Utility Equipment

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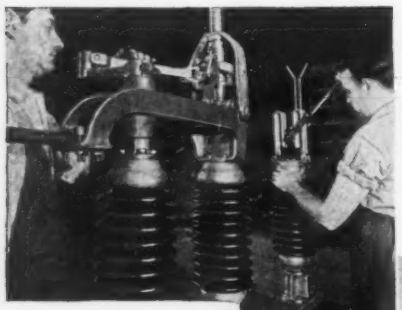
Canadian Plant
LEASIDE, ONTARIO, CANADA

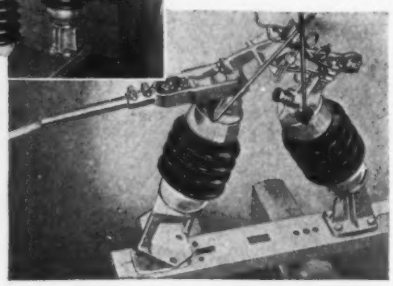
The Mark of JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. *Quality Products*

GROUP OPERATED DISCONNECTS

Kearney Group Operated Disconnect Switches feature sturdy, dependable construction, sleet breaking design and point pressure contacts.



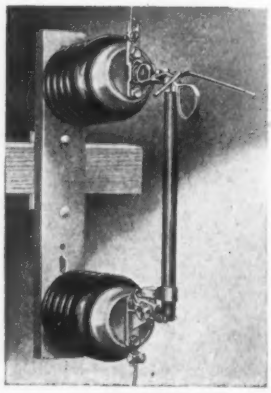
At left — Vertical break, Kearney Rotating Insulator Type Group Operated Disconnect Switch. Available in voltages from 7500 to 115,000 volts — 400, 600 and 1200 amperes.

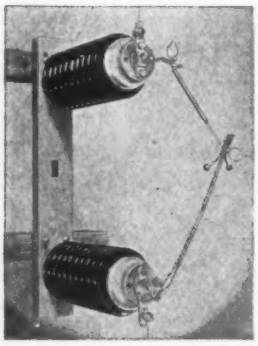


At right — Kearney Rocker Type Group Operated Disconnect Switch, that provides point pressure contacts with either wood or steel phase bar.

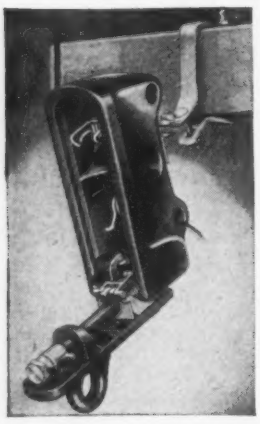
OPEN-TYPE FUSE CUTOUTS

Time tested and guaranteed Kearney Open-Type Fuse Cutouts shown here have all the advantages of such design features as point pressure contacts. *Right* — Kearney Trip-out Fuse Cutouts. Available in ratings 100 and 200 amperes, 5000 through 46,000 volts.





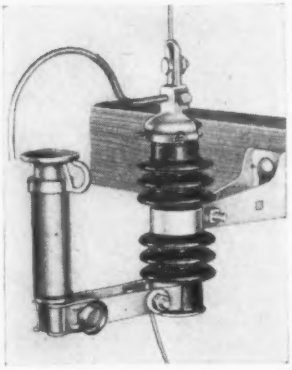
Left—15,000 volt Kearney Trip-O-Link Cutout Switch, has flash-over value and interrupting capacity in accordance with N.E.M.A. specifications SG9-20 for switches rated 50 amperes. Trip-O-Links are available in 50 and 100 ampere ratings, from 5000 through 69,000 volts.



TRIP-O-MATIC FUSE CUTOUTS

The Kearney TRIP-O-MATIC indicates when a fuse has blown. The approved Kearney trip-action is built into a closed housing of high grade wet process porcelain. The Bakelite door and fuse cartridge form a single unit which "trips out" when a fault occurs—clears the circuit—de-energizes the cartridge—gives visual indication of the outage. Ratings 5 and 7.5 KV—50 and 100 amperes.

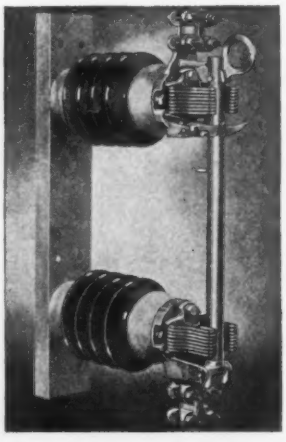
KEARNEY LIGHTNING ARRESTERS



The Kearney Type P Lightning Arrester shown here is ideal where line to ground short circuit current is of relatively high value. They have the expulsion tube gap principle — impulse ratings of 41,200 amperes and a follow current rating of 3000 amperes.

HOOK OPERATED DISCONNECTS

Kearney N.E.M.A. Hook Operated Disconnect Switches have multipoint pressure contacts, station post insulators and tubular blades as standard; while shoe-type contacts, pin and cap insulators and truss type blades are optional. Terminals can be supplied for connection to cable, flat bus or tubing. Available from 7500 through 46,000 volts, 200, 400 and 600 amperes—also 46,000 through 69,000 volts, 600 and 1200 amperes.

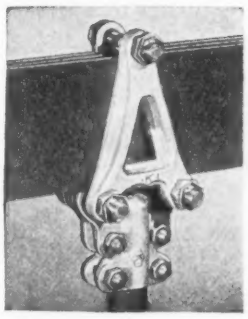


KEARNEY FUSE LINKS

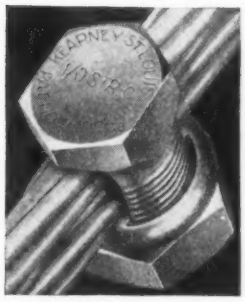
Kearney Fuse Links are designed for use in cutouts which require a flat terminal fuse link and in cutouts which require the round button. They are packed in the handy, convenient Pul-Tab Pak that provides quick easy identification. Five fuse links are in each Pul-Tab Fuse-Pak, twenty-five links in each carton.

POWER CONNECTORS

Both the Kearney Flat to Cable Tee Adapter (shown at right) and the Tube to Tube Tee Adapter are available for all standard size combinations. These modern, sturdy power connectors meet the requirements for handling increasing loads. Special power connectors are available to handle special jobs. All types of Kearney power connectors are made from alloys that combine high conductivity, great strength and corrosion resistance.

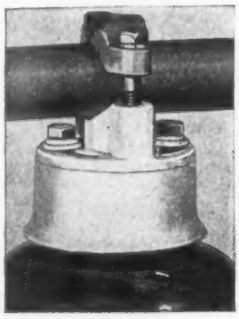


KEARNEY CON-NEC-TITES



These widely used CON-NEC-TITES make good, positive electrical connections. You will like the "hex" heads, uniform threads, sturdy construction and other design features of these popular solderless connectors. They are available in sizes to handle any size wire connection from No. 10 stranded up to 1,000,000 CM Copper.

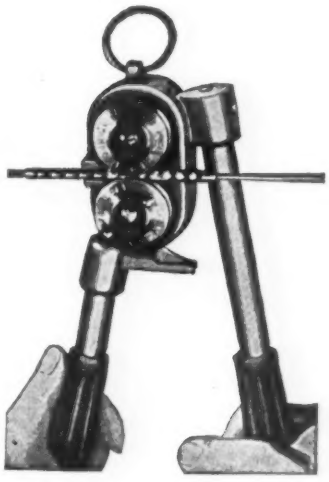
BUS SUPPORT FITTINGS



Shown at left is the Kearney outdoor type Round Bus Support Fitting with 3-inch bolt circle base vee-seat for round, solid or tubular bus. In addition, Kearney Flat Bar Bus Support Fitting and special fittings are available. You can simplify your problems on indoor and outdoor insulator supports by standardizing on Kearney Bus Support Fittings.

KEARNEY SPLICING SLEEVES AND MACHINE

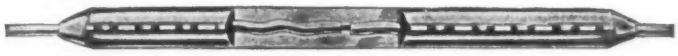
For secure splices that save wire, use the Kearney Splicing Machine to roll sleeves onto conductors. With this machine sleeves are rolled under tremendous pressure onto the conductors, giving strong, permanent splices.



2-WAY EXPANSION ANCHORS

For holding power that gives real security, use Kearney No. 8120 certified malleable iron Expansion Anchor. Will hold up to 10,500 pounds in ordinary soil and 14,000 pounds in clay. The blades expand 2½ times their rated size and have up to 63% of their area in firm undisturbed earth. Other sizes of Kearney anchors have similar features that give real security.

Sleeve before being rolled.



The same sleeve after it was rolled.

The sleeve is rolled down (see lower illustration) onto the conductor, thus forming a tight, compact joint of strength equal to the breaking point of the wire itself.

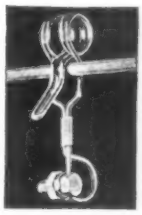
FOR BY-PASSING, GROUNDING AND TAPPING

No. 4767 Jumper Clamps for by-passing defective equipment.

Spring Type Grounding Clusters No. 7402 for safe grounding.

This clamp will accommodate from No. 6 solid copper to 1500 MCM stranded, maximum.

Kearney No. 3519 Series —spring type CON-NEC-TAP clamps.



OUR NAME MAYDWELL SPELLS QUALITY

MAYDWELL & HARTZELL

INCORPORATED

LOS ANGELES
SAN FRANCISCO
PORTLAND
SEATTLE

FOR SAFETY'S SAKE . . . USE CONDUIT *(Full Weight Rigid Steel)*

HIDING the Wiring

doesn't make it any SAFER

HIGH up, out of the way, why bother with conduit?

But "out of sight" didn't mean "out of mind" on this job. The hazards of dust and moisture are still present, even though the wiring seems to be out of the way. So the contractor protected the wiring with full-weight, rigid-steel conduit--further simplified his work by using pre-assembled conduit racks.

In new construction, under way now and being planned, you can give owners and tenants maximum protection by specifying and installing Youngstown "Buckeye" conduit. "Buckeye" has proved its dependability in unfailing, successful performance under all kinds of conditions, in all kinds of structures, for more than a quarter century.

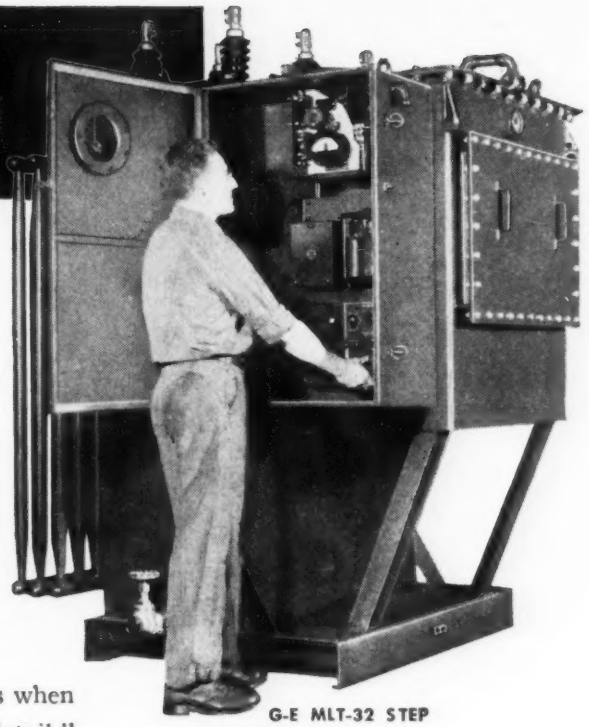
In every respect, "Buckeye" full-weight, rigid-steel conduit meets the requirements of the National Electrical Code which says that for hazardous locations and occupancies, the only wiring system approved as moisture, vapor, dust and explosion proof is rigid steel conduit.

Local distributors in all industrial markets have Youngstown "Buckeye" conduit in stock. For their names or for other information, write, wire or phone our nearest District Office.

Ask your distributor for:
Youngstown Buckeye Conduit...Pipe and Tubular Products...Sheets...Plates...
Electrolytic Tin Plate...Coke Tin Plate...Bars...Rods...Wire...Tie Plates and Spikes.

YOUNGSTOWN
THE YOUNGSTOWN SHEET AND TUBE COMPANY
GENERAL OFFICES · YOUNGSTOWN 1, OHIO
Export Offices - 500 Fifth Avenue, New York City
Manufacturers of
CARBON · ALLOY AND YOLOY STEELS

6 STEP REGULATOR DETAILS *that Cut Servicing Costs*



G-E MLT-32 STEP VOLTAGE REGULATOR

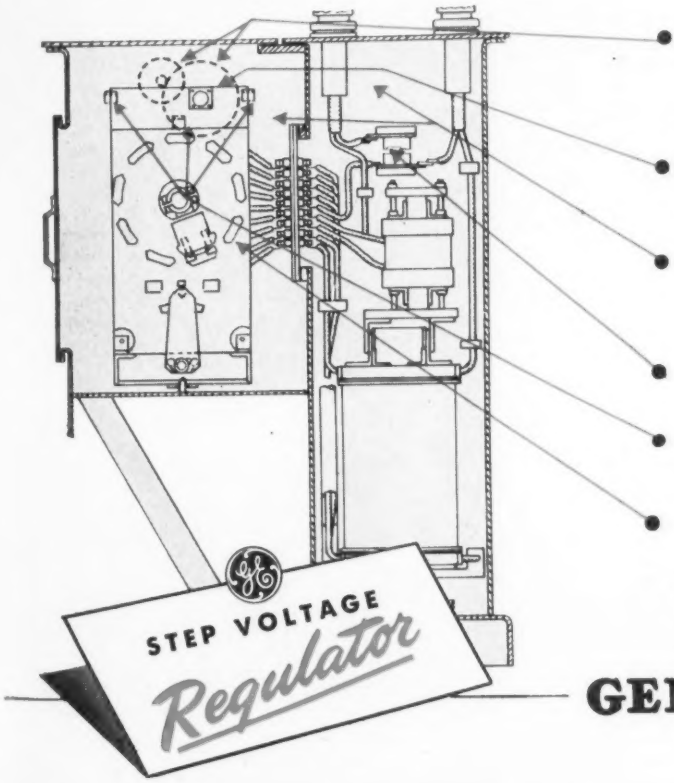
Oil-immersed, self-cooled, for indoor, outdoor service. Provides 10 per cent raise and 10 per cent lower regulation for 3-phase, 60-cycle circuits. Thirty-two 5/8 steps (33 positions).

Bulletin GEA-1577F gives complete information on MLT-32 voltage regulators ranging from 2400 volts, 125 kva to 69,000 volts, 750 kva. *Apparatus Dept., General Electric, Schenectady 5, N. Y.*

You save on cost of maintenance for six specific reasons when you install a G-E MLT-32 step regulator. Each one is a "detail," yet taken together they may make the difference between a paying investment and one whose gains are frittered away in maintenance expense.

Attention to detail is an important part of G-E engineering policy and construction practice. Beginning with the design, it carries through to the skilled application engineering assistance we're ready to give you on voltage regulation problems.

For full information on the MLT-32 or other G-E voltage regulators, call or write your G-E representative.



1. MOTOR OPERATING MECHANISM—Readily accessible in weather-tight control compartment. Hand operation accomplished by permanent handwheel. Operating motor is reversible, capacitor-type, permanently lubricated sealed ball-bearing motor, mounted in the top of the control cabinet *where it can be easily inspected or maintained.*

2. OIL SEAL FOR MOTOR SHAFT—Used where motor shaft enters switch tank below oil level. Prevents oil seepage into control compartment. Has low friction, *requires no adjustment.*

3. SEPARATE, OIL-TIGHT TANKS—Prevents switching arcs from contaminating oil in main tank. Permits quick access to switch for inspection *without* disturbing coil assembly, bushings or cover, or motor drive and control equipment. This simplifies servicing, *saves maintenance man-hours.*

4. *THYRITE BY-PASS—Connected across series circuit, Thyrite by-passes traveling waves and other disturbances. *This reduces stresses across series winding.*

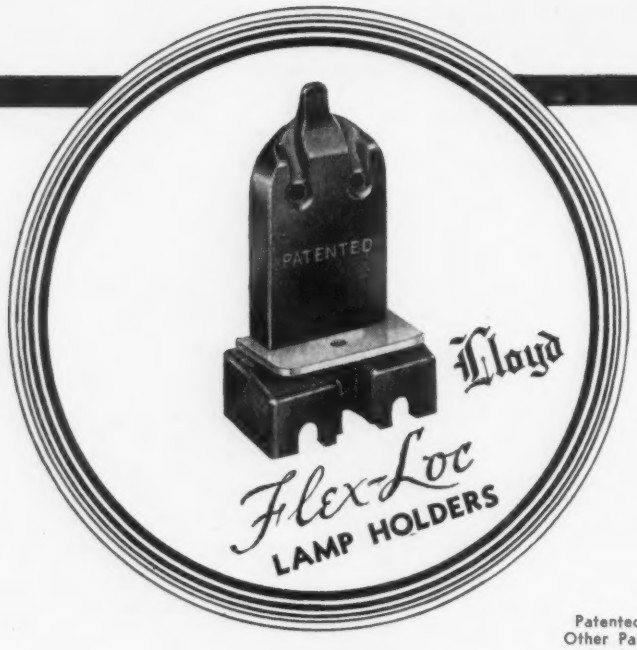
5. THREE POINT SWITCH SUSPENSION—Switch is sturdily supported by lugs at front corners and at rear. Centering pin is welded to tank bottom. *This prevents strains and maintains perfect alignment.*

6. QUICK-BREAK TAP-CHANGING SWITCH—Geneva gear drive gives shockless, coordinated fast action. Positions itself and accurately locks in place after each operation. Striking mechanical simplicity, with all contacts on one sturdy shaft, *contributes to freedom from service interruptions.*

* Trade-mark Reg. U. S. Pat. Off.

GENERAL ELECTRIC

404-42-5400



Patented
Other Pats.
Pend.

Pat. Nos.
2200443
2228210

DOUBLE BULLSEYE

Two Lloyd products which have become "musts" for the most economical . . . the most thoroughly satisfactory . . . the BEST fluorescent lighting.

FLEX-LOC LAMP HOLDER

FLEXIBLE: Automatically self-adjusting to variations in length of lamps and spacing of mounting holes. Engineered to fit all standard spacings. Easier to mount. AUTOMATIC LOCK is positive. No extra locking devices are needed. Lamp cannot fall out. PERFECT ELECTRICAL CONTACT: Brass contacts grip BOTH sides of lamp pins securely.

Listed and Approved by Underwriters' Lab., Inc.
E.T.L. Test Report No. 314454 Available
Approved by Canadian Standards Assoc., Approvals Div.

LLOYD AUTOMATIC STARTER

CUTS OUT deactivated or flickering lamps.
CUTS OUT current to lamp and ballast.
CUTS OUT high maintenance costs and high power consumption..
INCREASES LIFE of lamp and ballast.

Listed and Approved by Underwriters' Lab., Inc.
Certified by Electrical Testing Lab., Spec. 6

Lloyd Policy Insures Quality

LLOYD PRODUCTS COMPANY
PROVIDENCE 5, R. I.

FRANK H. BRAN CO.
400 E. 3rd St., Los Angeles

W. G. BRUCE CO.
2028 S.W. Yamhill St., Portland, Ore.

FRANK H. BRAN CO.
894 Folsom St., San Francisco

HARVEY M. OLMSTEAD
1534 Wazee St., Denver

W. M. SANDERLIN CO.
129 First Ave., Seattle, Wash.

PRODUCTS

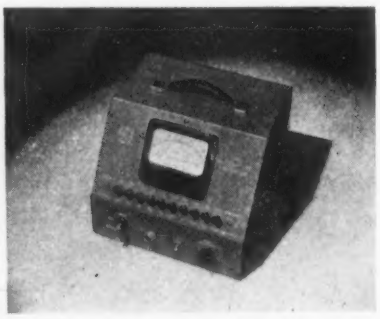
that are news

Oil Circuit Breakers (600)

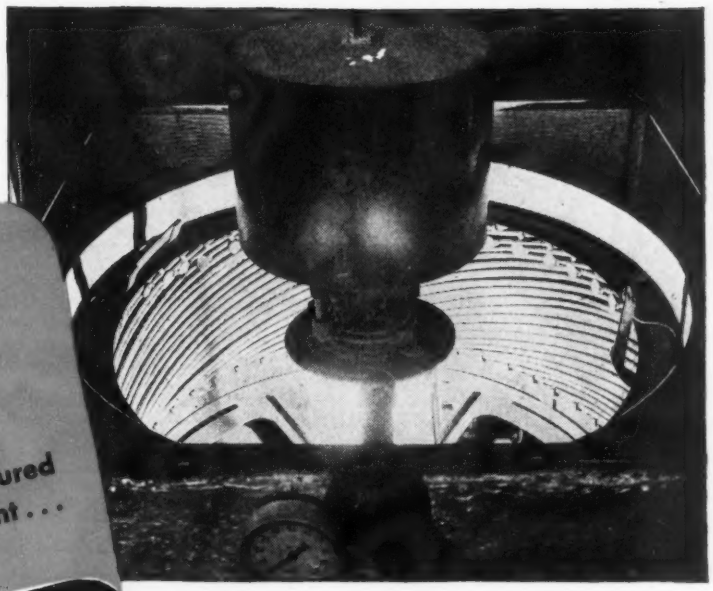
Kyle Corp. has a new 3-phase automatic oil circuit recloser for protection of 3-phase rural distribution systems. As described by the manufacturer, this new type is a practical combination of three single-pole Type H reclosers with the individual units so interconnected as to permit single-phase operation of any of the units so long as no lockout is obtained. The lockout mechanism is so connected that lockout of one unit automatically locks out the other two simultaneously. The standard Type 3H has two fast openings, followed by two time-delay openings. This permits fuse links to be so located that they will blow on permanent line faults before the recloser locks out. This coordination with fuse links permits isolation of permanent faults to branch lines.

Vacuum Tube Voltmeter (601)

G-E has designed a high-sensitivity vacuum-tube voltmeter for laboratory and industrial electronic testing. This voltmeter, Type AA-1, has ten calibrated voltage ranges, the lowest being 10 millivolts full scale for readings as low as 1 millivolt, and the highest 300 volts. For all frequencies between 15 cycles and 500 kc., the accuracy is plus or minus 3%; between 500 kc. and 1 megacycle, accuracy is plus or minus 5%. The instrument can be used with reasonable accuracy between 10 and 15 cycles and 1 and 1.5 megacycles, according to the manufacturer. The instrument is also graduated in decibels and covers a range of minus 65 to plus 45 from a reference level of 6 millivolts into 500 ohms. The input resistance is 2 megohms. A ten-position push-button switch mounted on the front panel allows any working range to be selected without passing through intermediate ranges.



In the Weather-Ometer, Weatherproof coverings are subjected to the accelerated aging effects of sunlight, wetting and drying, freezing and thawing, simulating rain, sleet and searing sun.



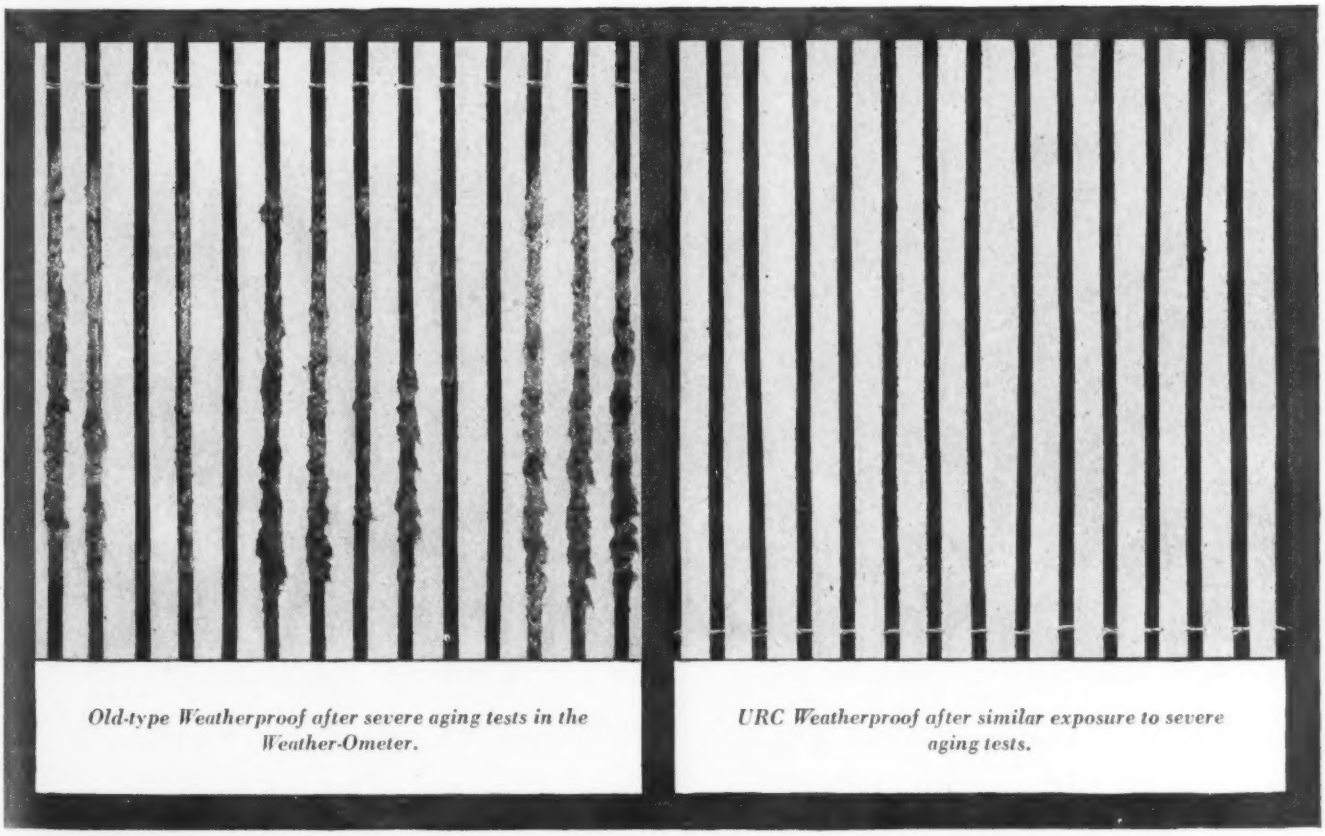
THE PAST...
"Festooning" was not unusual...

THE PRESENT...
Today, lasting Weatherproof is assured by URC research and development...

For Continuity of Service... Anaconda Triple Braid or Duraline URC

• The long field service expectancy of URC Weatherproof is proven by exhaustive tests on materials and finished wire and cable. These data, plus actual field experience, indicate URC Weatherproof will last for years and years.

46299



Old-type Weatherproof after severe aging tests in the Weather-Ometer.

URC Weatherproof after similar exposure to severe aging tests.

LOOK TO *Anaconda* FOR WEATHERPROOF THAT LASTS!

ANACONDA

Junction CONDULETS

for pulling and connecting electrical conductors — all sizes

The illustrations show a representative selection from the hundreds of different junction Condulets that are listed in Crouse-Hinds Condulet Catalog 2500. Many other housings in all sizes can be furnished with blank covers for use as junction Condulets.

(CONDULETS are made only by CROUSE-HINDS)

No. 9
of a series of advertisements which demonstrate that CROUSE-HINDS "complete line" means much more than just a range of sizes—there is a wide variety of highly specialized types in each classification.

A Nationwide Distribution Through Electrical Wholesalers

CROUSE-HINDS COMPANY
Syracuse 1, N. Y., U. S. A.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Kansas City — Los Angeles — Milwaukee — Minneapolis — New York Philadelphia — Pittsburgh — San Francisco — Seattle — St. Louis — Washington. *Resident Sales Engineers:* Albany — Atlanta — Charlotte — Indianapolis — New Orleans
CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

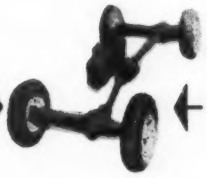
CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS

DEPENDABLE FWDs

. . . able to go wherever utility work has to be done!

FOUR-WHEEL-DRIVE

A "plus" that pays.. in many ways !



Rugged, dependable FWD utility trucks will get the men and equipment through to do the job wherever it has to be done, regardless of weather, road conditions, or even lack of roads! Wherever live-trouble "pops". . . wherever there's a tough job of maintenance or construction work, pole-pulling or pole-setting . . . anywhere, far off the highway over rugged terrain or in deep muck . . . you can rely on FWDs.

These are utility-engineered trucks . . . they give you all the advantages of the true FWD four-wheel-drive principle with center differential . . . power drive and traction on all wheels . . . balanced weight and power distribution . . . working-strain shared by two driving axles instead of one . . . and dependability in performance that makes FWDs the first choice of hundreds of utilities, many of whom operate big FWD fleets. See your FWD dealer or write for information on FWDs now ready to go to work for you.

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory: KITCHENER, ONTARIO

FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

"More Power on More Wheels"

FWD Distributors: ARIZONA—Arizona-Cedar Rapids Co., 401 N. First St., Phoenix; CALIFORNIA—The Four Wheel Drive Auto Co., 1339 Santa Fe Ave., Los Angeles 21 and FWD Pacific Co., 469 Bryant St., San Francisco 7; COLORADO—Liberty Trucks & Parts Co., P. O. Box 1889, Denver 1; IDAHO—Intermountain Equipment Company, Broadway at Myrtle St., Boise; MONTANA—Steffeck Equipment Co., 11 E. Cutler St., Helena; NEVADA—Allied Equipment Co. Reno; NEW MEXICO—The Myers Company, Las Cruces; OKLAHOMA—Halliburton Oil Well Cementing Co., P. O. Drawer 471, Duncan; OREGON—Feenaughty Machinery Co., 112 S. E. Belmont St., Portland 14; UTAH—Cate Equipment Co., 49 E. 9th So., Salt Lake City; WASHINGTON—Feenaughty Machinery Co., 1028 6th Ave., So. Seattle 2, Glenn Carrington & Co., 91 Columbia St., Seattle and Feenaughty Machinery Co., 715 N.Division St., Spokane; WYOMING—Wortham Machinery Co., 517 W. 17th St., Cheyenne; ALASKA—Glenn Carrington & Co., Nome, Fairbanks, Anchorage, and The Graybar Electric Co., in over 90 principal cities.

CRESCENT

Multi-Conductor Control-Cables

WITH
SYNTHOL
INSULATION AND JACKET

Each of the 7 conductors in the CRESCENT Control Cable shown here is insulated with SYNTHOL thermoplastic and the cable assembly as a whole is protected with a SYNTHOL sheath. SYNTHOL is more stable than rubber compounds. It is highly resistant to moisture, oils and most chemicals and will not support combustion.

The individual conductors are color coded for easy identification.

CRESCENT Control Cables are widely used for remote control operation of motors, circuit breakers and other electrical power equipment, and for many types of automatic or supervisory control circuits.

CRESCENT

WIRE and CABLE

NEMA

CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

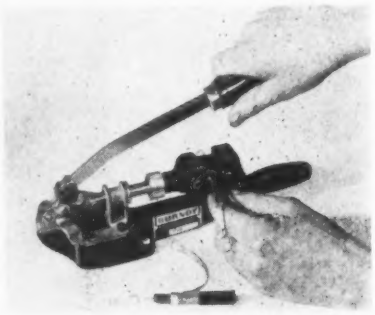
Utility Trucks (602)

The 1946 Four Wheel Drive truck line includes three major weight classifications ranging from 3- to 15-ton rated capacity. The H series of light-heavies includes three- and four-ton trucks; the U series, five-ton, and the M series, ten-ton. Six wheel drive tractors and trucks rated at 15-ton capacity are in the company's standard line and are listed for immediate delivery. The line has been restyled and features modernized radiator grills, streamlined fenders and skirting and a new cab. Illustrated are two U series trucks in operation on the Southern California Edison system.

Varnished Tubing (603)

Turbotuff, William Brand & Co.'s new varnished insulating tubing and sleeving, is said to be non-cracking regardless of angle or duration of bend. Other characteristics claimed for it are enhanced dielectric values, decreased moisture-absorption factor, improved resistance to oils, acids, alkalis and electro-chemical influences. It is available in standard grades, per ASTM specifications, and in standard colors. It is produced in endless coils up to No. 14 and standard bundles of 30- to 42-in. strands.

Tool (604)



For installing coaxial and shielded cable connectors and standard "Hydent" connectors, Burndy has developed a portable, manually operated "Hytool." Removable dies provide for easy insertion and proper placing of cable and connector. The connection is made by a single stroke of the tool.

Tape (605)

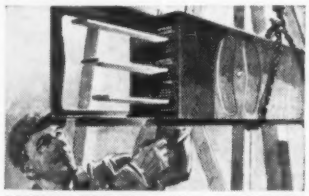
Cohrlastic, a tape made by coating Fiberglas with Silastic, has been announced by the Connecticut Hard Rubber Co. It is said to have dielectric strength of 1,100 volts per mil and to retain this strength at temperatures up to 500°F; to be resistant to arcing and corona cutting; waterproof and water repellant. It is available in rolls of various lengths, widths and thicknesses.

Solder Wire (606)

Two packages of solder wire, a quarter-pound and a half-pound spool, have been added to the Lenk line. The solder will be of virgin metal with either acid or resin core

Plugged in . . . power on . . . time 12 minutes

NO WAITING FOR POWER *with a BUStribution System—simply raise the plug to the nearest plug-in opening, snap its contact fingers over the busbar conductors and bolt the plug to the duct casing. The plug itself is a current protective device for the machine it serves.*



SCREW DRIVER AND WRENCH *are all the tools you need to completely dismantle and reassemble a BullDog BUStribution System. Made up of prefabricated, standardized sections, the entire system can be used again and again in new combinations and at new locations. No fabrication on the job is necessary.*

NO SCRAP WITH ANY MOVE! *There is no waste when you move a BullDog BUStribution System from one location to another. The component materials—steel duct, copper bus bars and vitreous porcelain—do not readily deteriorate and can be used indefinitely.*

Capacities: Feeder Type — 600 Amps. to 4000 Amps.; Plug-in Type —225 Amps. to 1350 Amps.

You Can Do It With BullDog BUStribution DUCT

Quick production changes are easy to make in a plant equipped with BullDog BUStribution Duct, because each 10-foot section has ten handy plug-in outlets for the ready insertion of circuit-protective plugs to convey current from the bus bars in the duct to the machine.

One machine or a whole battery of machines can be moved—anywhere in your plant—without costly delays for rewiring. It's actually less than a 12-minute job to plug in a machine at any new location—and you cut in the power without down time for the rest of the line.

Because they are prefabricated, BullDog Bus Duct systems save countless hours of installation time. And their flexibility gives you power and light where they are needed and when they are needed. BullDog Duct systems can be moved quickly from one production set-up to another with complete re-use of all material and full protection against accidental short circuits.

If you would like to learn more about this flexible, economical method of power distribution, call a BullDog field engineer, or write for descriptive folders.

BullDog Also Manufactures Vacu-Break Safety Switches—SafToFuse Panelboards —Switchboards—Circuit Master Breakers—Industrial Trol-E-DUCT for Portable Tools, Cranes and Hoists—Universal Trol-E-DUCT for completely flexible lighting.

BULLDOG

ELECTRICAL DISTRIBUTION SYSTEMS

BULLDOG ELECTRIC PRODUCTS COMPANY, BOX 177, R. PK. ANNEX, DETROIT 32, MICHIGAN.
In Canada: BullDog Electric Products, Ltd., Toronto. Field Engineering Offices in All Principal Cities.

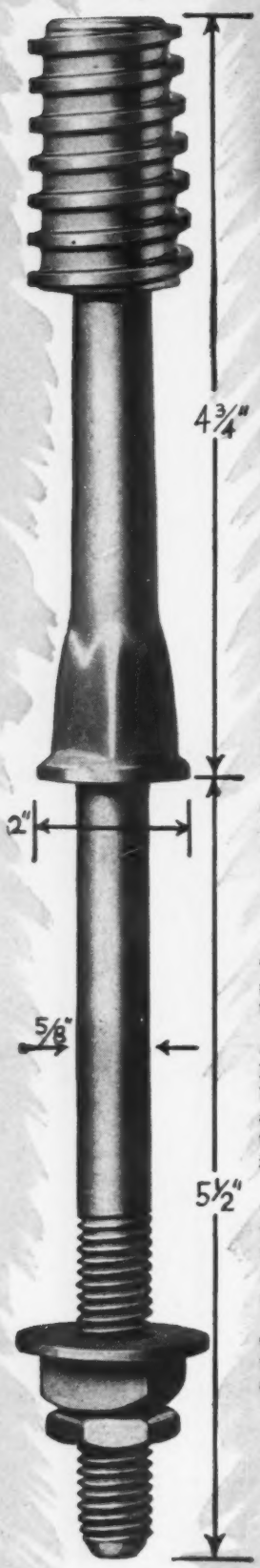
CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue
Portland, Oregon, Tel. Garfield 2844

Safety Switchboard Company
1445 Stevenson St.
San Francisco, Calif., Tel. Hemlock 2470

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street
Los Angeles, Calif., Tel. Jefferson 2224

CAREFUL DESIGN Teams Up wit
GOOD Workmanship to Mak
L-M POLE LINE HARDWAR
Do the Job Better!



STEEL INSULATOR PIN NO. 223848

- 1" or 1¾" Allen lead head, cast directly onto pin by special bonding process, makes head an integral part of the pin, impossible to turn or pull off.
- Packaged with cardboard cap on each pin to insure protection during shipment.
- Pin is made of carefully forged steel to provide ample stiffness and toughness. Base, construction, and design meet all EEI Standards.
- Large base gives good bearing surface on the cross arm.
- Hot-dip galvanized. Pin is carefully pickled before galvanizing to assure close bond between zinc and steel for increased protection.
- Clean, sharp cut threads on shank permit nut to spin on freely and to hold firmly when Palnut is tightened.
- Furnished with round washer, one square nut and Palnut.

Line Material Company prides itself on constructing pole line hardware that is design-right and durable. The products in the L-M hardware line are designed the way the users want them to meet construction and maintenance requirements.

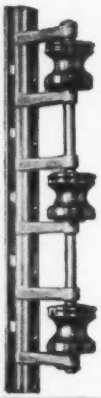
Look at the steel insulator pin shown here, one of a number of L-M pins. Carefully forged . . . hot-dip galvanized . . . securely bonded lead head . . . clean, sharp threads. L-M insulator pins are made with one thought in mind—to do a good job and keep on doing it for a long, long time. These pins are available in popular sizes, extending 4¾" and 6" above the cross arm, with varying lengths of shank. They are carefully packed for shipment, with a cardboard cap over each pin to insure complete protection of the rolled lead threads.

Ask the L-M Field Engineer

His broad experience, plus the accumulated knowledge of his company, give the L-M Field Engineer exceptional ability to help you. He knows many ways to solve line construction and maintenance problems; so ask him for his suggestions and ideas.

Weldsteel Secondary Rack No. 23038

One of the most popular types. No. 9-gauge pressed steel; insulator supports arc-welded to full depth of channel—extra strength for heavy service. Others for 2, 3, or 4 wires, from 4 to 12 inch spacing; 9 to 32 inches long.



Strain Clamp No. 907

Forged steel, hot-dip galvanized. Light in weight, but exceptionally strong, with high tensile strength. Reversible tongue with grooves of different depths on each side gives proper contact with sizes from No. 6 solid to No. 4/0 stranded.

Universal Guy Clip No. CL-117X

Forged steel; rounded corners prevent injury to wire. Opposed bolts permit full 360° turn of wrench. Long non-slip grooves; large gripping area. Five sizes for ¼" to ½-inch wire.

Take-Off Insulator No. A-260010-1

Efficient, economical for handling multiple service drops. Eliminates overloaded rack spools and tangled connections. Steel yoke snaps into slots in insulator band, permits attaching yoke first. For rack or pole mounting.

LINE MATERIAL
POLE LINE HARDWARE

PRINT IN BINDING

It's the QUALITY that assures the DEPENDABILITY of L-M Large Distribution Transformers

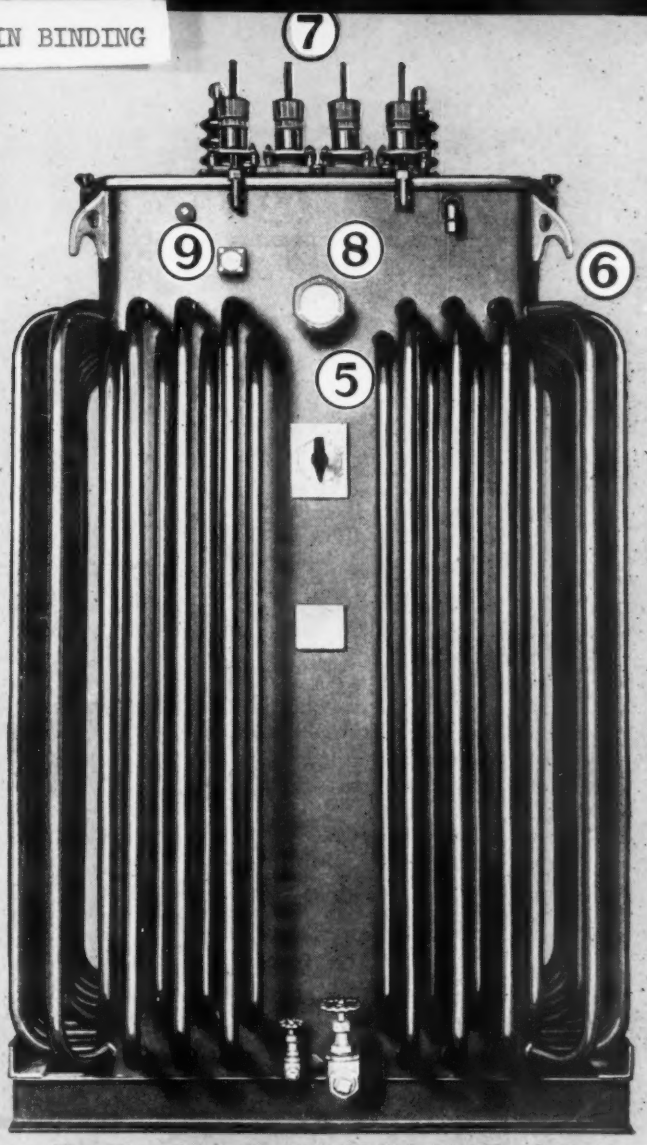
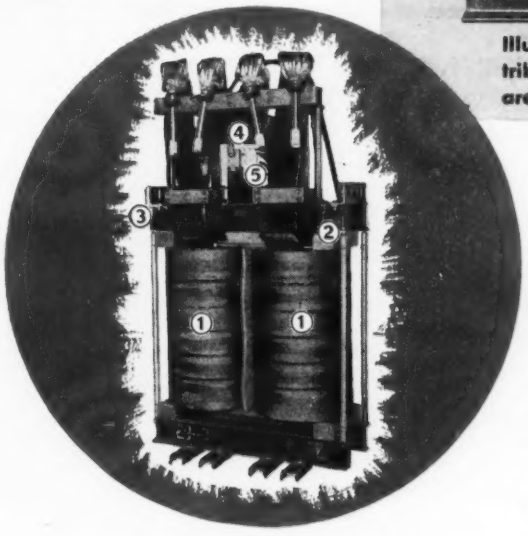


Illustration shows the L-M 500 Kva, 14,400 volt distribution transformer. Similar design and construction are available in 150, 200, 250, 333, and 500 Kva.

...u can install 'em and forget 'em

...und coils are assembled on a core with a cruciform ...ss-section, approximating the round. This round ...l shape is better able to withstand fault current ...tortion, and provides channels for circulation of ...oling oil between core and coil. The dependable, ...icient operation, low maintenance, and long life of ...ese larger transformers are assured by the excellent ...sign, materials used, careful construction, care ...ken in assembly, and the extensive tests made to ...ure the desired characteristics and long life.



...onstruction Features ...f L-M 150-500 Kva Transformers

...ound coils wound on cruci...form cross-section core.

...ore is rectangular construc...tion, with cruciform cross-sec...tion, laminated of high grade ...ilicon steel.

...eavy duty rugged core ...lamping, specially designed ...o assure coil stability under ...ll transportation and service ...onditions.

...econdary leads are inter...eaved to hold stray losses ...own and to minimize react...nce, and are securely clamp...ed to withstand short circuit ...onditions.

...op changer assembly.

...il cooling tubes.

7. Secondary terminals.
8. Oil thermometer.
9. Oil level indicator.

L-M Makes All These Types of Distribution Transformers

L-M Distribution transformers in many types and sizes meet the majority of utility and industry requirements. Here are some transformers L-M designs and manufactures:

Conventional designs, Round-Wound construction up to 25 Kva, conventional laminated construction up to 500 Kva; Rural transformers; 3-I Completely Self Protected transformers; Booster transformers 3-Phase transformers; Subway type transformers

Write for the Data You Need—L-M will gladly furnish required information on any of these distribution transformers. Address: *Transformer Division, Line Materia Company, Zanesville, Ohio.*

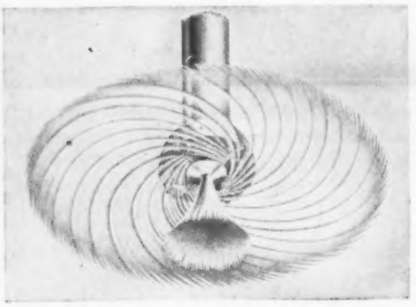
LINE MATERIAL
TRANSFORMERS

L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware •

NOZZLE-SWIRL ADDS TO CABLE LIFE

8 YEARS OF SERVICE CONFIRMS LONG-LIVED PROTECTION OF OXIDE-FREE LEAD SHEATH

More than eight years ago General Electric developed the nozzle-swirl process of applying lead sheathing to its paper-insulated cable. G-E cable, lead-sheathed by this process, found immediate acceptance. Today, eight years of service experience with this cable is giving convincing evidence that the G-E "nozzle-swirl" process adds years to cable life. In these installations, cable faults and signs of sheath weakness have been brought to a new low; trouble caused by oxidized lead in the sheathing no longer occurs.



Lead is forced through bottom hole and swirled by blades, assuring oxide-free fusion with old charge.

THE NOZZLE-SWIRL PROCESS

The presence of occluded oxides is the greatest single factor in the failure of lead sheathing of cable. When such oxides are trapped in the lead sheath, flow lines and laminations cause weak areas.

These oxides normally originate in the charging cylinder of the lead extrusion press, the surface coat of oxide on the old charge being trapped under the new charge.

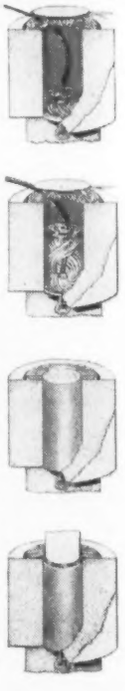
The nozzle-swirl process, as shown in diagrams (right), employs a filling-spout nozzle of special design, and the injection of inert gas, to scour oxides from the junction of old and new charges. The two fuse completely, so that a homogenous mass is fed to the die block which forms the sheath around the cable.

UNIFORMITY ASSURED

This produces a lead sheath with no flaws to cause failure. G-E lead-sheathed cable is uniform in every foot of its length. There are no hidden weak spots to show up when power load variations put pressure on the sheath.

When you order G-E lead-sheathed cable, you get the only cable with this extra assurance of maximum cable life. For complete information on what it can mean in savings to you, check with your local G-E representative or ask for Bulletin GEA-2968. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

HOW SHEATH-LEAD IS KEPT OXIDE-FREE WHEN CHARGE IS ADDED

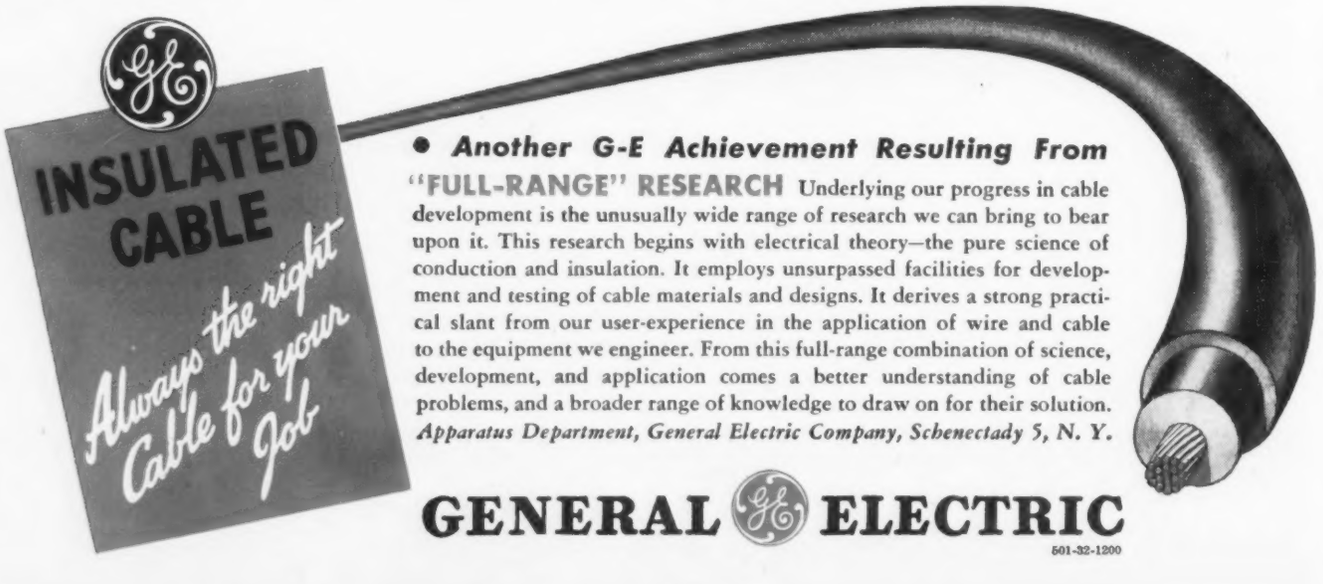


New molten lead from the special nozzle has already penetrated into the old charge. The swirling lead takes the oxides up and away from junction and shim.

The lead continues to swirl, removing the entire shim, pulling all oxides to the center, and uniting them in a ball. The new charge has now completely fused with the old charge.

The cylinder is filled, and the top of the charge containing the oxides has overflowed. The ball of oxides has been removed and the surface has been skimmed.

The lead is now solidifying and the ram has begun "packing" the charge. When the lead has been cooled, the ram will force the semiplastic mass through the die block, thus forming the sheath around the cable core.



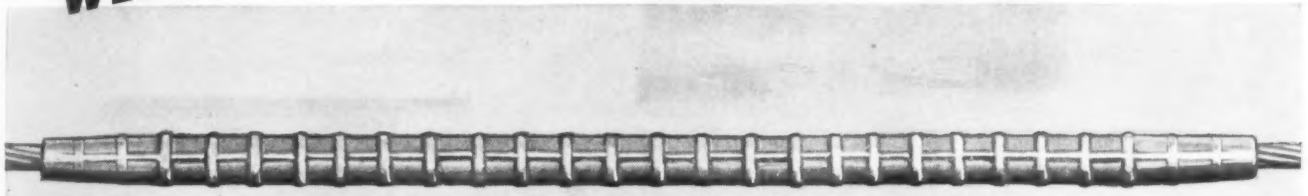
● ***Another G-E Achievement Resulting From "FULL-RANGE" RESEARCH*** Underlying our progress in cable development is the unusually wide range of research we can bring to bear upon it. This research begins with electrical theory—the pure science of conduction and insulation. It employs unsurpassed facilities for development and testing of cable materials and designs. It derives a strong practical slant from our user-experience in the application of wire and cable to the equipment we engineer. From this full-range combination of science, development, and application comes a better understanding of cable problems, and a broader range of knowledge to draw on for their solution. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

501-32-1200

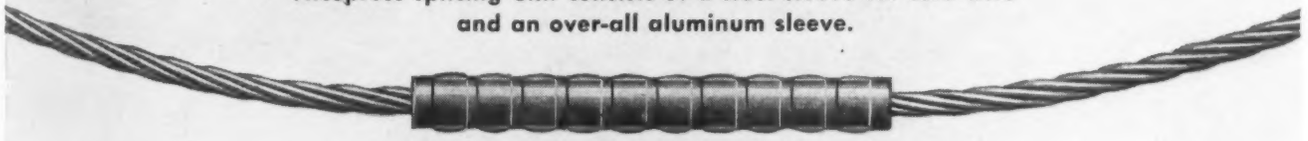
Nicopress SLEEVES for A·C·S·R·

WILL GIVE YOU PEAK PERFORMANCE!

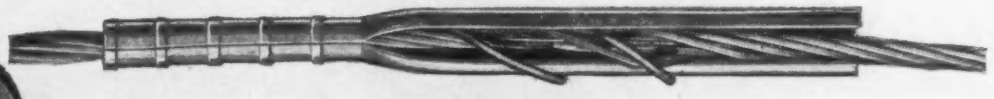


COMPLETED LINE SPLICE

Nicopress splicing unit consists of a steel sleeve for core wire and an over-all aluminum sleeve.



COMPLETED JUMPER SPLICE



REPAIR SLEEVE
(Partially Completed)

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

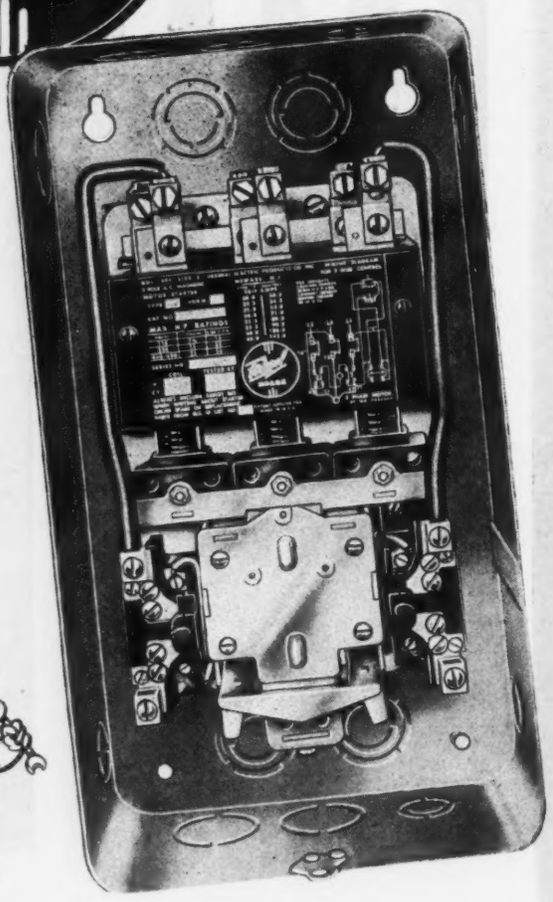
Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY

Federal
NOARK

SIZE 3
MAGNETIC
MOTOR STARTER



For man-size jobs of stop-and-go
Without a bit of care or woe
This starter really fills the bill . . .
A fine example of Federal's skill!

Sets a new standard of ease and speed in replacement of any stationary or moveable contacts. Coil replacement in a few seconds without disturbing line or load connections. Greater compactness, yet more ample wiring space. Silver contacts on all current interrupting points. Exclusive vertical ball-bearing operation for highest speed solenoid action. Overload relays, combination hand or automatic reset, for dependable protection.

FEDERAL ELECTRIC PRODUCTS COMPANY, INC.
EXECUTIVE OFFICES: 50 PARIS ST., NEWARK 5, N. J. PLANTS: HARTFORD, CONN. NEWARK, N. J.

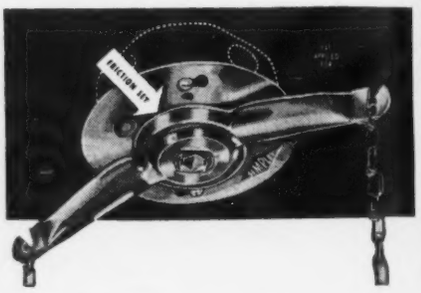
FM Transmitter (607)

Westinghouse has a new 1- and 3-kw FM transmitter claimed to maintain close frequency control without use of critically tuned elements or moving parts. The transmitter is placed in operation by connecting the audio input, r-f transmission line and input power supply. Higher powers may be secured by adding amplifiers to the basic unit. Single tuning control adjusts M.O. center frequency. Frequency modulation is obtained in a simple circuit using capacitors, resistors and non-microphonic diode tubes. R-f carrier is generated, multiplied and amplified in five steps. Standard commercial type tubes, operated below rated plate voltage, are used throughout.

Elongation Testers (608)

Low-stress elongation testers for measuring stiffness or springiness of large and fine copper wire have been developed by G.E. The large-wire tester measures elongation from 17.9 to 80.8 mils in diameter and the portable fine-wire instrument tests wire from 3.1 to 17.9 mils in diameter. The former is used by stretching wire between two clamps, one stationary and one movable, and applying, by means of a jack-screw operated lever arm, a unit stress of 15,000 lb. per sq. in. With the fine-wire tester, wire is clamped between vises located at the ends of two movable arms and stress is applied by means of weights.

Fixture Hanger (609)



Simplet Electric Co. is offering a friction set fixture hanger with 360° adjustment. Base and receptacle remain stationary but hanger arms may be turned. This hanger screws to 3¼- or 4-in. outlet boxes. Over-all depth of box is 7/16 in., diameter of cover is 4 1/16 in., over-all length of arms 9 in. Hanger is furnished with 15-amp. receptacle, two 5-ft. chains, hooks and cord clips.

Capillary Pen (610)

Brown Instrument Co. has introduced an improved capillary pen for three-pen rectangular industrial recording instruments. The pen is a single-tube type. The end in contact with the instrument chart is swaged to a smaller diameter and the capillary is less than half the diameter of earlier design. Outside diameter has been reduced to about half the original size.

Tachometers (611)

O-Z improved tachometers are said to be accurate within ½ of 1%, to be unaffected by outside influences, to be balanced for use in any position, to have a dustproof and foolproof rotating gear shift. Over-all length is 5½ ft.; net weight, 19 oz.; gross weight with carrying case, 30 oz.

(607)

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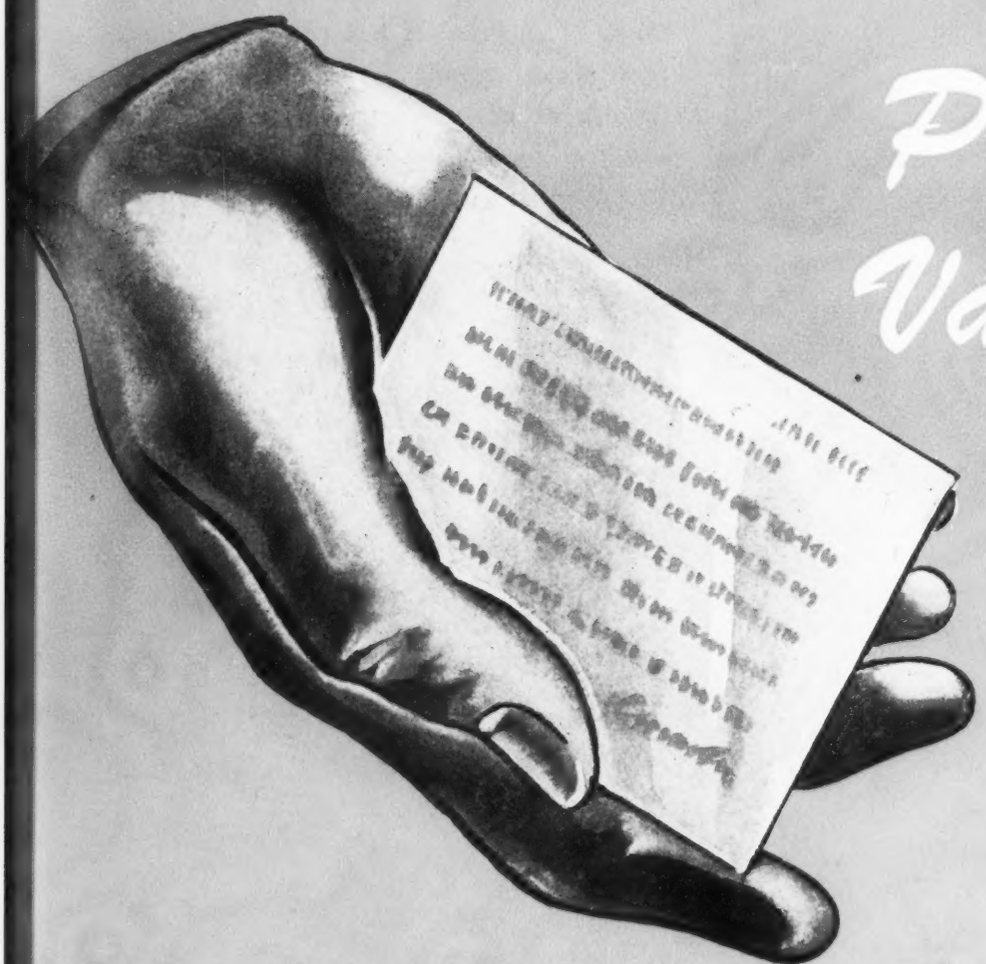
HAND YOUR INSULATING VARNISH PROBLEMS TO US

Pedigree Varnishes



Depend on the Pedigree Industrial Laboratory for help in the formulation of materials for purposes which can not be satisfied by the use of standard varnishes. But first . . . be sure to check the charts in the new Pedigree Catalog. You will probably find the answers to most of your requirements there.

Send for your FREE copy today.

Distributed by

INSULATION MANUFACTURERS CORPORATION

INSULATION AND WIRES INCORPORATED

TRI-STATE SUPPLY CORPORATION

Manufactured by

THE R. D. GEORGE COMPANY, ST. LOUIS, U. S. A.

it's California living

California living is electrified living. In few states of the nation has the use of electricity been so far advanced. Here, the householder, the storekeeper, the farmer and the manufacturer employ electricity for light, heat and power. It is the servant of all.

There are reasons for this general employment of electricity. It is low in cost—16 per cent lower than it was in 1939 although almost every living cost has climbed to a new high. Electricity is available everywhere in Northern California from the lines of the P. G. and E. The service is adequate and dependable.

Manufacturers, jobbers and dealers in electric appliances have their difficult problems. Economic conditions, for the moment, bear heavily on their sales plans. But these wrongs will be righted. And when they are cleared away, the market will be there—waiting to be served.

Industry cooperation will help. P. G. and E. will do its share.

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

They Came, Mr. Greeley!

If Horace Greeley, canny old editor, could look down upon the Northern California of today, he would find his vision of nearly a century ago fully justified.

He would find here the center of the New Pacific World with industrial, business and market potentials far beyond the dreams of the pioneers—an electrified West.

P. G. and E. has been selling Northern California to the nation in advertising designed to draw attention to the opportunities here that promise rich reward to further American enterprise—new population, new industry, new production, new markets.

To members of the Electrical Industry, the message can be applied with equal force. The market is here—it will be greater. Current impediments to appliance and material supply and restrictions on fair profits will be overcome. Then will come buyers—hungry for the electrical necessities of modern living.

To the Members of Pacific Coast Electrical Association—Good wishes for the complete success of your first postwar convention. Success will come with cooperation.

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

EW 24X-646

MEASURED DEMAND

assures recovery of fixed charges

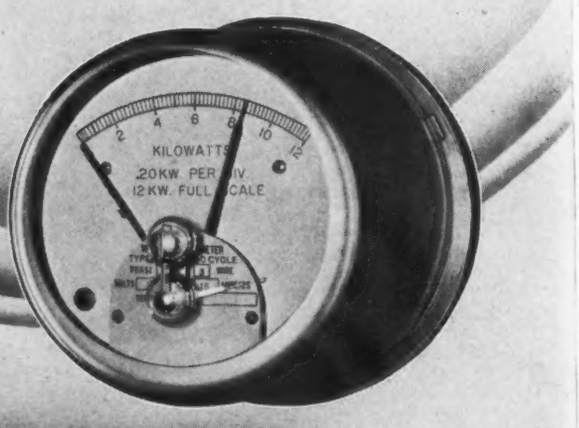
SANGAMO DEMAND INSTRUMENTS

The increasing dissimilarity of modern loads of commercial customers makes it impractical to use averages in establishing a sound basis for recovery of fixed charges. The large proportion of plant investment in relation to the total cost of service deserves exact determination of demand. This can best be done by measurement. Sangamo Lincoln-Type WD Demand Meters are simple, accurate, and economical instruments for this purpose. Sangamo Demand Instruments are available in an extensive line—designed for your particular needs.

Type JWS

Type LC-3 with LG Demand Register

Combination Watthour and Lincoln Demand Meter, and meter with demand register, for installations where mounting space is limited.



Type WDS

Sangamo Lincoln-Type WD Demand Meters are made in both A and S construction for any singlephase or polyphase circuit for the measurement of kilowatt demand. Operating independently of the watthour meters, these instruments are a convenient means of obtaining demand on existing watthour meter installations, as well as on new services.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD • ILLINOIS

IT TOOK A CUSTOMER TO SHOW ME SALES I WAS MISSING

Contractor: I hear you're having a hard time with your new housing development. I suppose wiring is going to take a beating.

Builder: No — I don't think so. Cutting the wiring to the absolute minimum won't save enough to make it worth while. I have a reputation for building up-to-date homes, you know, not houses that are obsolete before the paint is dry. I want to protect that reputation.

Contractor: You mean to say that you will insist on a real adequate wiring job even in your low-cost houses?

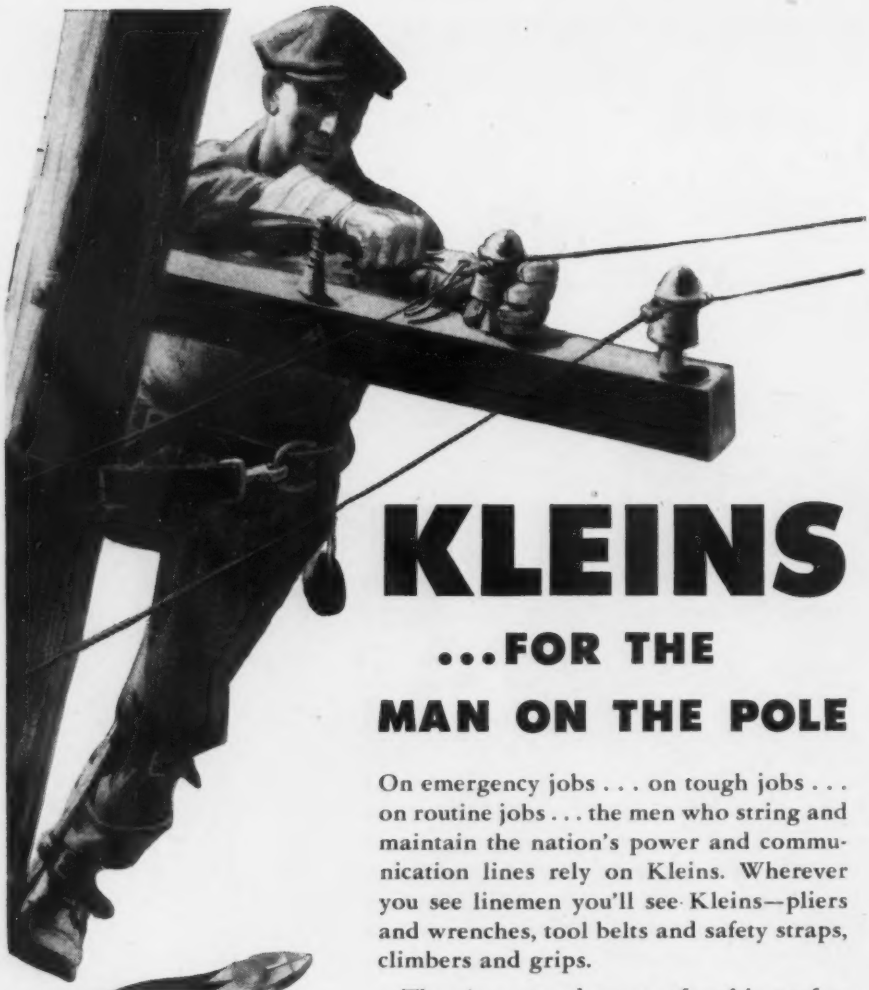
Builder: I sure will. In my low-cost houses I'll have to omit some of the extras that people want. But small home owners use just as much electricity as people who live in large homes — even more maybe. And I sure won't leave out anything as essential as a sound wiring system.

Contractor: I'm real glad you feel that way. And I'm sure that good wiring will not only help to sell your houses, but will keep the owners satisfied as long as they live in them. That's a selling idea I'm going to start pushing right now.

GENERAL ELECTRIC

P.S. Why not ask *your* G-E representative how you can benefit from the promotion of adequate wiring in residential, industrial, and other buildings. Or you may want to write for information to Section AW661-18, Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.

AW ADEQUATE WIRING SERVES AND SAVES — THE KEY TO THE HOME OF TOMORROW



KLEINS

...FOR THE MAN ON THE POLE

On emergency jobs . . . on tough jobs . . . on routine jobs . . . the men who string and maintain the nation's power and communication lines rely on Kleins. Wherever you see linemen you'll see Kleins—pliers and wrenches, tool belts and safety straps, climbers and grips.

There's a sound reason for this preference. For linemen and electricians—men who know good tools—also know of the quality materials and expert craftsmanship that go into every piece of Klein equipment. To them this excellence means safety, efficiency, speed . . . on every job.

Today Klein is in production on its complete line of quality equipment. Of course, demand still exceeds supply—but your supplier will furnish the Klein equipment you need just as soon as possible.

Klein Pliers

Klein-Kord Tool Belts

Klein-Kord Safety Straps

Klein Climbers

ASK YOUR SUPPLIER

Foreign Distributor:

International Standard Electric Corp., New York

The Klein Pocket Tool Guide showing the Klein line and containing useful information will be sent on request.

Since 1857

Mathias KLEIN & Sons

Established 1857 — Chicago, Ill., U.S.A.

3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

Level Control (612)

Photoswitch level control Series 10 is a floatless control containing no vacuum tubes and operating with low voltage in the probe circuit. Stainless steel probe rods are suspended into the tank from probe fittings. The liquid to be controlled makes or breaks contact with the probe and transmits to the control a minute electrical current at low voltage. This current controls a power circuit which operates a relay to actuate signals, valves or pumps. The unit operates on 115 or 230 volts, 50/60 cycles, a-c. Total power consumption is ½ watt. Contacts are designed for motor starter, motorized or solenoid valve operation. Arc suppression is supplied on both contacts for increased life. Probe circuit will carry a resistance as high as 3,500 ohms.

Range (613)

A new model Westinghouse electric range, the Champion D-64-46, features fast-heating surface units, deep-well cooker and large True-Temp oven. This range is white porcelain enamel with chromium trim and is of built-to-floor design. It measures 38 x 24⅞ x 41⅝ in. There are three utensil drawers, a platform light to illuminate cooking surfaces and Tel-A-Glance switch knobs on the back panel. Three 5-heat Corox surface units are provided, one 8-in. diameter and two 6-in. diameter.

Window Type Fan (614)

For small homes, apartments, stores and offices, a 20-in. window type cooler fan has been developed by Emerson Electric Mfg. Co. It will exhaust 3,500 cu. ft. of air per minute in free air; has a capacitor motor and sheet aluminum blades. Cabinet dimensions are 24 in. wide, 9 in. deep and 24 in. high.

Clock (615)

Sheffield Instrument Corp. is offering a table-size grandfather clock reproduction, utilizing its patented magnetronic movement. The movement combines use of a pendulum with an electric clock motor, and is said to operate equally well on any cycle in the range from 25 to 125 c.p.s.

Insect Killer (616)

A patented device for killing insects is being offered by D.D.T. Lite Inc. The device consists of an electric light bulb with a wire screen coated with D.D.T. crystals. The company has announced that it will also make a snap-on screen to fit bulbs already installed.

SPANG-CHALFANT

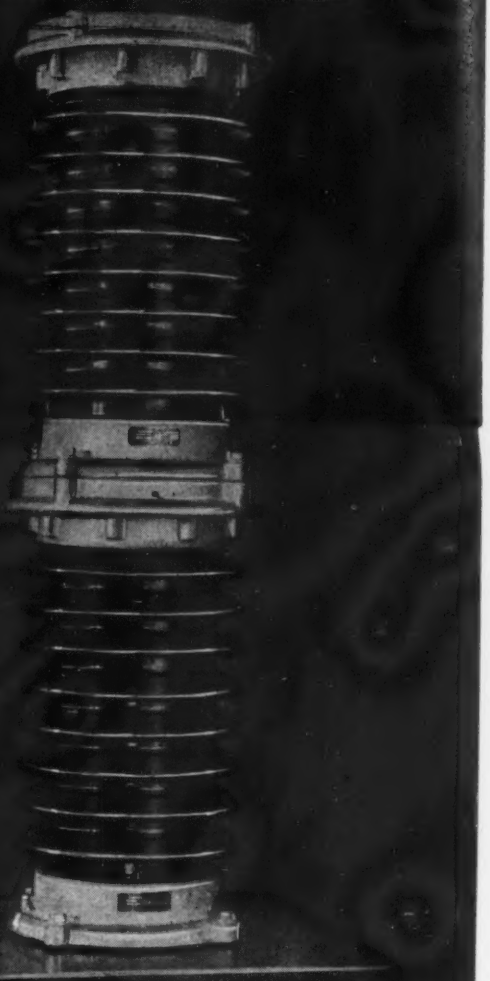
Division of The National Supply Company

General Sales Office: Grant Building, Pittsburgh 30, Pa.

District Offices and Sales Representatives in Principal Cities

BETTER DESIGN AND PERFORMANCE

FOR CARRIER-CURRENT COUPLING



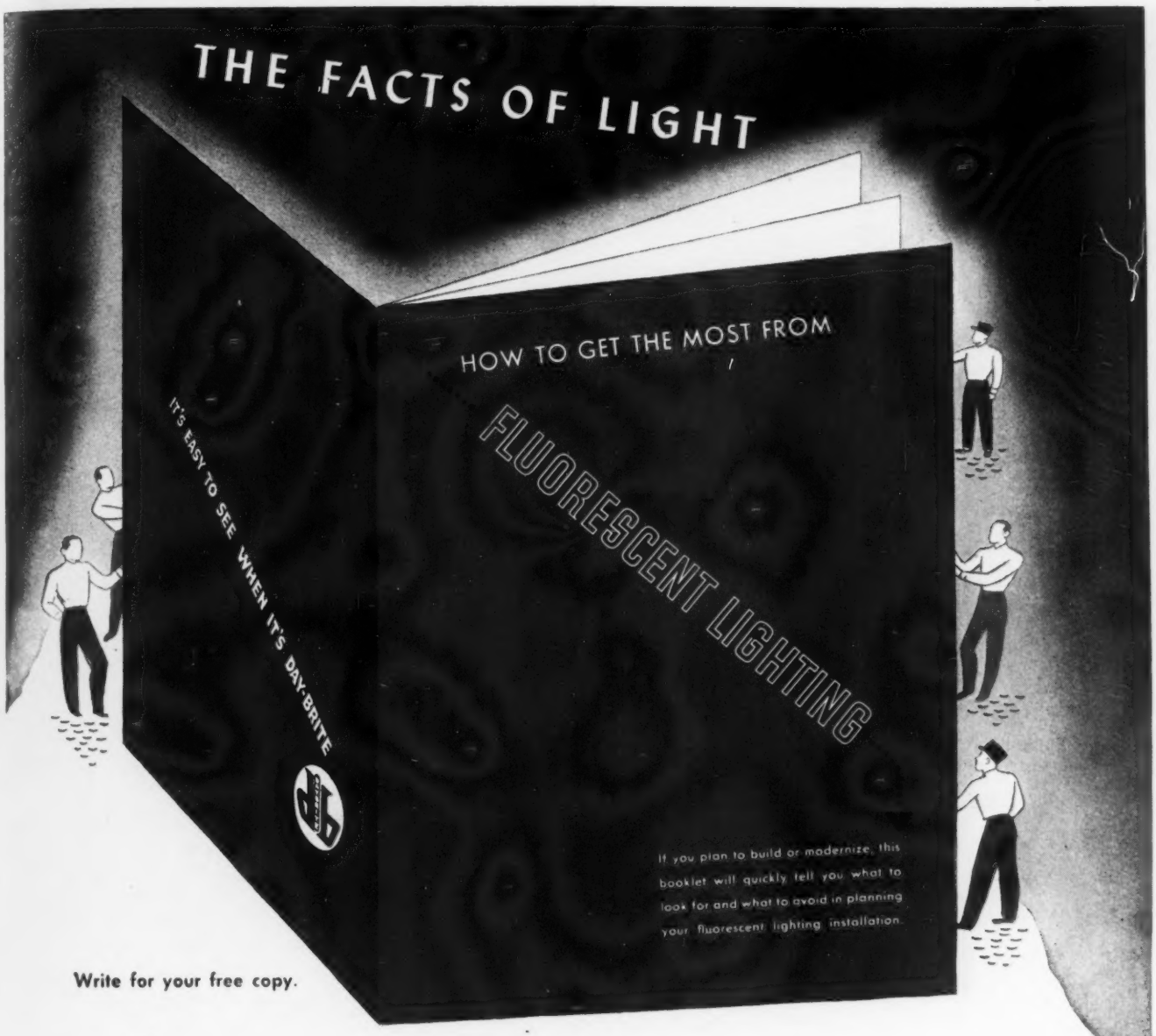
OUTSTANDING in quality and performance is the enlarged Type CA unit for carrier-current coupling. Typical of Cornell-Dubilier's improvements in capacitor design are Type CA's fog-type petticoats which provide a large creepage path between terminals to give high resistance at high frequencies. Galvanized malleable iron mounting flanges permit stacking for high voltage connection. The base is large enough to accommodate the mounting of auxiliary equipment. Both base and top are specially sealed for leakproof service. New inner construction gives great tensile strength.

Investigate the advantages of this Type CA carrier current coupling capacitor. Your local C-D Field Engineer will be glad to answer your questions, or you may write to us. Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey.

Cornell-Dubilier World's Largest Manufacturer of **Capacitors**

CORNELL-DUBILIER CD CAPACITORS

Capacitors for Power-Factor Improvement, Carrier-Current Coupling, Surge Protection


THE FACTS OF LIGHT
HOW TO GET THE MOST FROM
FLUORESCENT LIGHTING
IT'S EASY TO SEE WHEN IT'S DAY-BRITE
If you plan to build or modernize, this booklet will quickly tell you what to look for and what to avoid in planning your fluorescent lighting installation.

Write for your free copy.

It's the fixture that determines the value and quality of a lighting installation—the fluorescent tube produces only light.

Only sturdily built, scientifically designed fixtures can give you *all* the benefits of modern fluorescent lighting—overall, glareless, abundant light—lasting efficiency and easy maintenance.

The demand for fluorescent fixtures is greater than the present production capacity of qualified manufacturers. Waiting a little longer for better fixtures will pay in the long run.

Day-Brite Lighting, Inc., 5411 Bulwer Ave., St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.
In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ontario

1068

IT'S EASY TO SEE WHEN IT'S

DAY-BRITE

Lighting

WESTERN MADE

Quality
LIGHTING FIXTURES

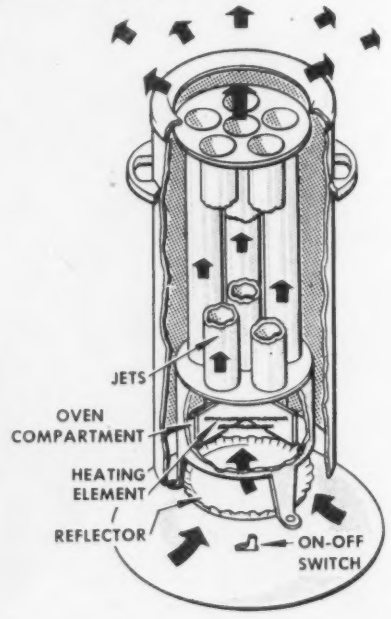
The West supports one of America's leading manufacturers of lighting equipment . . . producing quality fixtures bearing a nationally known label. With production concentrated on the Pacific Coast, Smoot-Holman Co. assures western users a dependable source of supply for all types of commercial and industrial incandescent and fluorescent lighting.

SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD CALIFORNIA
MADE IN U.S.A.

LOOK FOR THIS LABEL FOR THE FINEST IN INCANDESCENT AND FLUORESCENT LIGHTING

Heater (617)

An electric heater which adapts jet propulsion principles to home heating has been developed by Scientific Heater Co. Inc. Called the Circu-Lectric, this heater is built on the same thermodynamic principle as the jet engine. Cold air is heated and expanded by a 1,250-watt electric heating element within an oven compartment, the heated air being forced upward through six jets with a velocity claimed to be equal or superior to that generated by a conventional fan type unit. According to the manufacturer, pressurized heat flows from the jets at a rate of more than 3,400 B.t.u. per hour, but the outer jacket never becomes too warm to touch since cold air, drawn by suction between the jet tubes and the jacket, cools it. Available in crackle finish of gray, brown or green with aluminum base and trim, the heater is 20 in. high, 12 in. wide, weighs 7½ lb. It operates on 110-120 volts a-c or d-c. Operating cost at average city rates is said to be approximately 1¾c per hour.



Phonograph Pick-Up (618)

An electronic phonograph pick-up, by means of an armored vacuum tube in the tip of a phonograph tone arm, has been developed by Bendix Aviation Corp., Radio division. As described by the manufacturer, mechanical undulations are transmitted from the record groove by a filament which introduces them directly into the electron stream within the armored vacuum tube. The device, which will be introduced on Bendix AM-FM radio phonographs, is claimed to reproduce delicate tones, to cut down record wear, overcome scratch.

Range Improvements (619)

Added as standard equipment to the Electromaster Banquet model range are an all-metal lamp and a built-in Minute-Master. The Minute-Master is a timing device which signals at the end of a preset period up to 60 min.

Power Booster (620)

The Zipper power booster for electric shavers has been announced by Edward J. Scheribel & Co. This device plugs into the regular outlet and the shaver is plugged into it.

Steel Strand

of uniform high quality

GRAYBAR OFFERS CRAPO STRAND . . .
COMPLETE POLE-LINE SUPPLY SERVICE . . .
FASTER DELIVERY!

● Graybar can supply *Crapo* galvanized steel strand in the specifications best suited to your individual requirements. *Crapo* strand is engineered and manufactured under control of the most severe laboratory tests and has proved its ability to meet the most severe field use. *Crapo* strand will hold the load.

Graybar also distributes *Crapo* galvanized wire — and first-quality pole-line hardware, insulators, pins, tools, poles, and crossarms. The Graybar Outside Construction Specialist near you can supply all the information you want and will gladly help select and apply the best items for your needs.

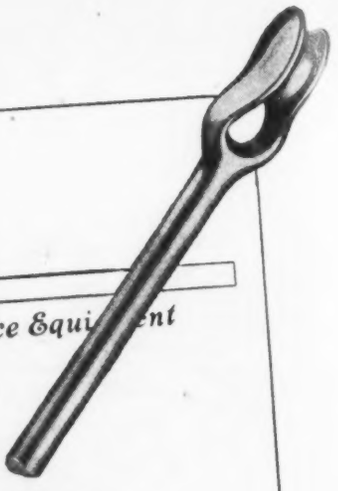
Delivery from the local Graybar warehouse can save you time. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.*

4612

IN OVER 90 PRINCIPAL CITIES

Everything for Your Pole Lines via GraybaR

What about the Anchor Situation . . .



A·B·CHANCE CO·

Line Construction and Maintenance Equipment

OFFICES
NEW YORK
CHICAGO
DALLAS
KANSAS CITY
ATLANTA

210 N. ALLEN STREET
CENTRALIA, MISSOURI

Dear Customers and Friends:

Although we are manufacturing more than three times the number of anchors that we produced before the war, we find it impossible to ship orders promptly. In fact it is still necessary, in most cases, for us to accept quantity orders for delivery in several months.

However, we are optimistic about the situation because our production records indicate that once the backlog of orders is disposed of, we will be in a position to furnish more anchors annually than were used by both the electrical and communications industries in any pre-war year

The requirements of the Armed Forces during the war, made it necessary for us to expand our facilities to the extent that we now produce more anchors in four months than we previously manufactured in a year.

In 1946 we will produce more than a million and a half Steel Expanding Anchors. Our production of Never-Creep Anchors, Screw Anchors, Rock Anchors, and other types has increased proportionately. We are overcoming the heavy backlog and, although our delivery promises are still far from good, prospects are exceptionally favorable for considerable improvement in our deliveries.

What we did for Uncle Sam, we can also do for you, but we need your cooperation. You can help the situation by placing your orders with your regular source of supply only. Placing duplicate orders will complicate matters, tie up stocks, and delay deliveries.

Yours very truly,

F. Sano Chance

President.

E ANCHOR RODS
NDING EQUIPMENT

THIMBLEYE GUY FIXTURES
TIPS TAP CLAMPS

CONSTRUCTION TOOLS
TIPS FUSED TAPPERS

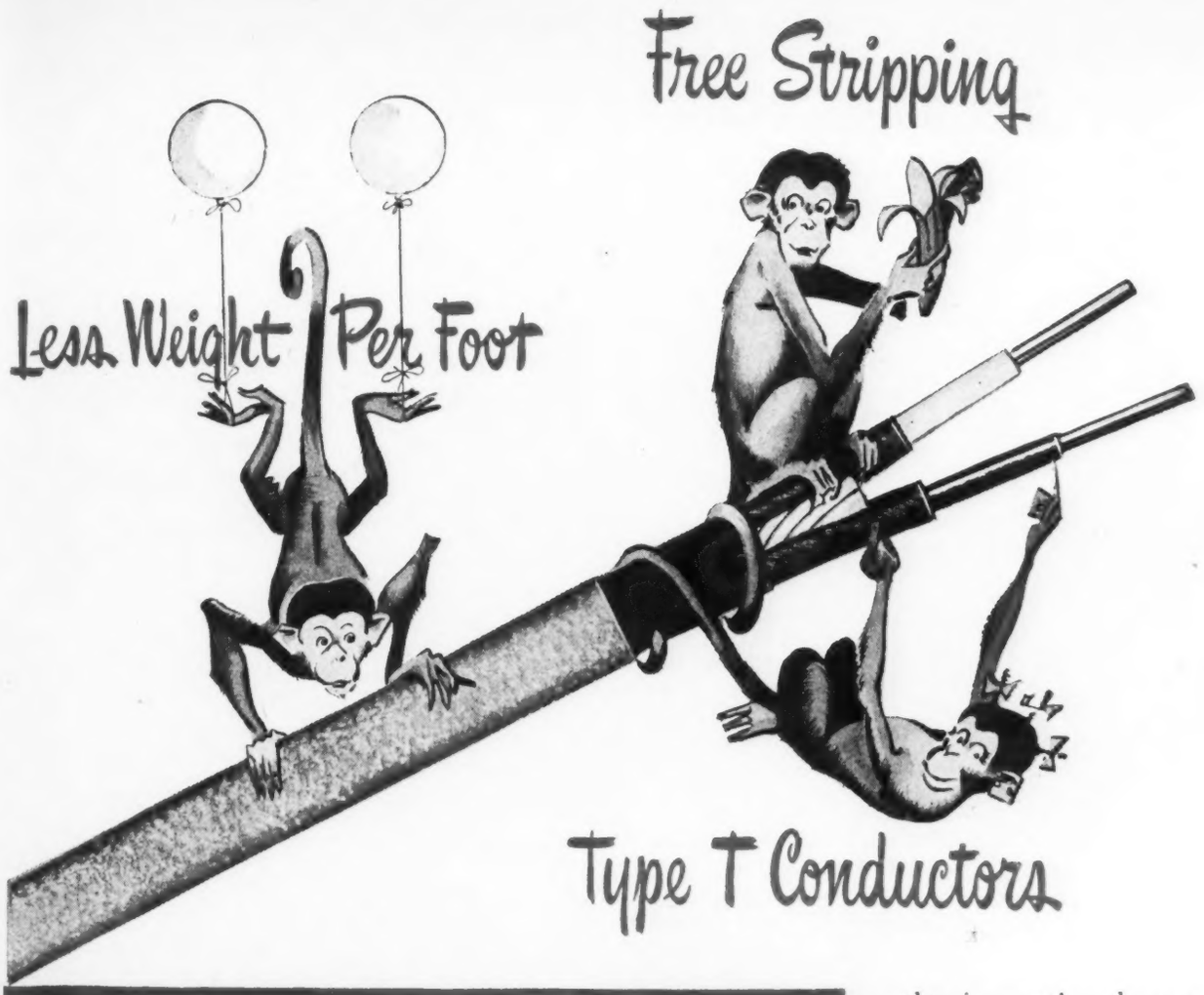
CHANCE CABLE CARE
SWITCHES CUTOUTS

PUBLIC UTILITIES SINCE 1907

A·B·CHANCE CO·

CENTRALIA, MISSOURI. SAN FRANCISCO, CALIFORNIA

C467



IT'S PVX THE NEW NON-METALLIC SHEATHED CABLE FOR RESIDENTIAL AND FARM WIRING

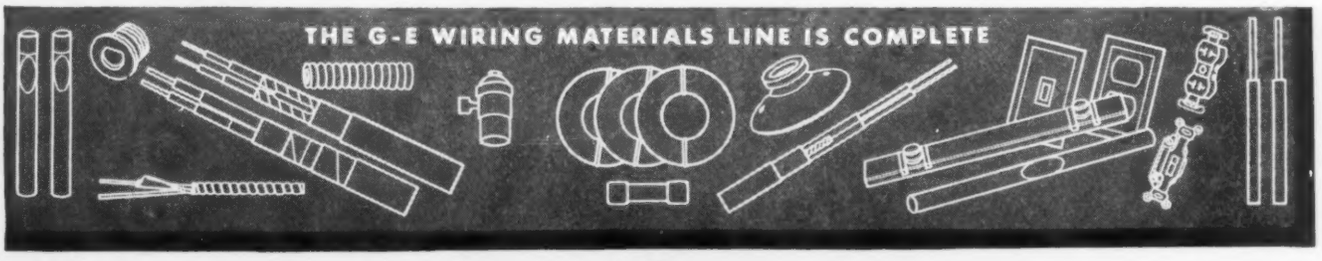
REGISTERED TRADE MARK

Take a good look at the benefits of this new thermoplastic-insulated cable. Check its features against your jobs' requirements. You'll find many reasons for using it in new wiring, rewiring or maintenance work.

The Type T thermoplastic-insulated conductors, paper wrap, and over-all braid on PVX all strip easily to save time in making splices and connections. PVX (14-2) weighs only 77 pounds per 1000 feet, or 27 pounds lighter than comparable Type R non-metallic cable. This lighter weight makes handling and installation easier, reducing "wear and tear" on busy workmen. The over-all braid is tough and moisture resistant, with an improved finish that makes it smooth and non-tacking.

There are many other advantages that make PVX especially well suited for open and concealed work where permitted by local Codes and the National Electrical Code. It resists flame, oils, acids, and alkalies. Conductors are permanently colored for positive identification. PVX is available with two or three conductors in sizes 14 to 4, approved for 60 C operation.

Ask your G-E Merchandise Distributor for more complete information, or write to Section W662-18, Appliance and Merchandise Department, General Electric Company, Bridgeport, Conn.



GENERAL ELECTRIC

DEPEND ON—INSIST ON—

P. R. MALLORY & CO., Inc.

MALLORY CAPACITORS

Mallory MSG Capacitor:—Small, compact AC Motor Starting Capacitor that fits almost every mounting bracket or box. Replaces rectangular capacitors with leads, lugs or studs. Each capacitor is packed with complete set of universal mounting hardware and installation instructions.

Necessary leads, lugs, screws, and nuts are included in each box for any type connectors.

Mallory Type "P" Capacitor:—Plastic case overcomes moisture absorption problems, and provides maximum insulation. May be used to replace cardboard insulated aluminum-case capacitors. Splash-proof plastic end cap and simplified "snap on" mounting bracket available when capacitor is used as original equipment.

Distributed by

INSULATION AND WIRES INCORPORATED
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MINNEAPOLIS 3, MINN.

TRI-STATE SUPPLY CORPORATION
LOS ANGELES 13, CAL. • SAN FRANCISCO 7, CAL. • SEATTLE 4, WASH.

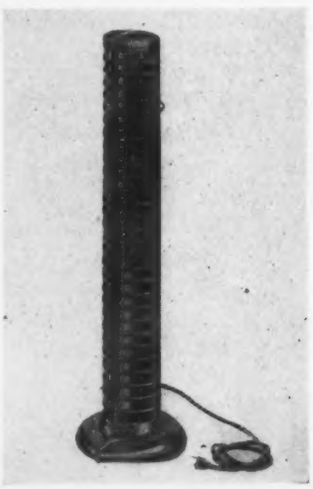
Oven Heater (621)

A new Chromalox oven heater, Type NOU modified, operates at oven temperatures up to 950°. Heating element terminals are centralized at one end of the assembly and all connections are brought to a single enclosed terminal box. The assembly consists of 14 high-temperature chrome steel sheathed strip heaters, with combined rating of 8 kw. at 230 volts. Heavy sheet metal end brackets are punched for mounting to walls or bottom

of oven, strip heater elements being mounted in the end bracket at a slight angle to encourage air circulation if unit is on oven wall. Where forced-air circulation is employed, assemblies may be used as air duct heaters, with slight change in the position of the strips. For single-phase operation only, the heater is 33½ in. long, 28 in. high, 3 in. deep. Physical dimensions and electrical rating may be altered to suit specific requirements, according to Edwin L. Wiegard Co.

Portable Heater (622)

Thermador has a long, slender, portable electric heater, selling under the trade name, Longfella.' Available in sun bronze, this heater is just over 3 ft. high and has a 10-in. diameter base; weighs about 6¾ lb. It is equipped with a heater cord, operates on 1,320 watts, 120 volts a-c or d-c, has Underwriters' approval.



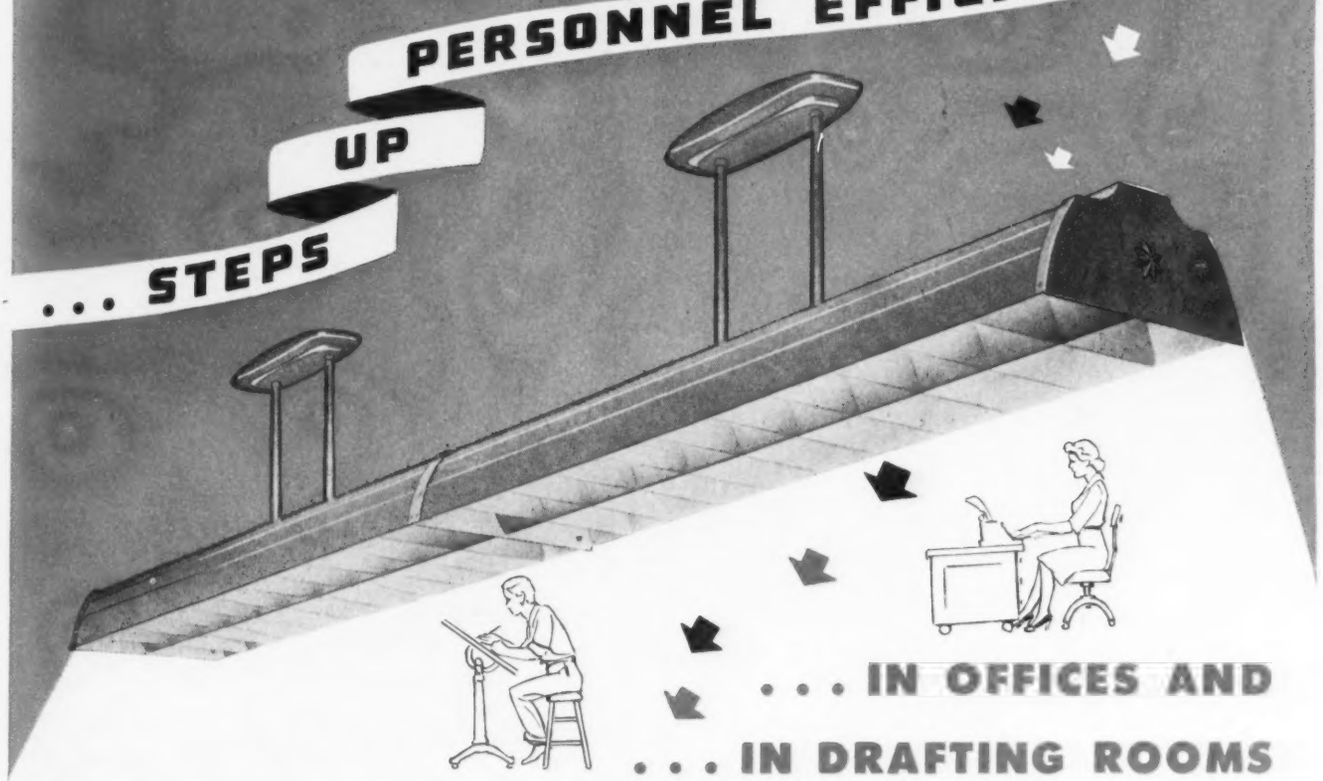
Lampholder (623)

A new G-E fluorescent circline lampholder has two spring loaded tension supports, lampholder and supports comprising a three-piece unit for three-point mounting. All three pieces are made of clear plastic and have die-cast hubs with ⅛-in. pipe threads and two set screws. The lampholder has four 24-in. leads, two white for lamp connections and two colored for starter connections.

THE "Forty-Sixty"

PERSONNEL EFFICIENCY...

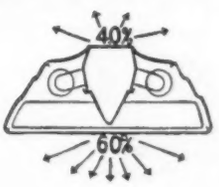
...STEPS UP



...IN OFFICES AND

...IN DRAFTING ROOMS

CUT COSTS WITH EFFICIENT GLARELESS LIGHTING



Good lighting in the office and drafting room will improve office and engineering efficiency and reduce overhead. Curtis "Forty-Sixty" (designed to direct 40% of the light upward, 60% downward) will provide just the balanced lighting needed to produce optimum working conditions. In modern offices and drafting rooms, where room brightness and freedom from glare, as well as working plane illumination are factors governing personnel efficiency, this unit is the logical choice.

Your maintenance staff will like this unit too. Made of Alzak Aluminum with no horizontal diffusing surfaces to collect dust, maintenance costs are at a minimum.

Consult your supplier for full details.

CURTIS
Lighting
INC.
6135 WEST 65th STREET
CHICAGO 38 • ILLINOIS

10,000,000,000 OHMS

for leakage resistance measurements at low potentials

WILL INDICATE:

Insulation Properties

Leakage Resistance

Conductivity of Insulating Materials

Leakage due to moisture absorption and surface moisture

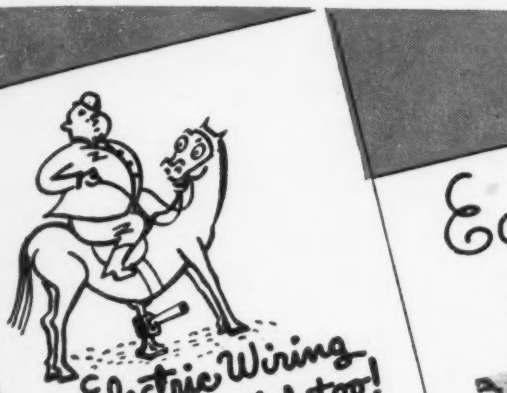
★WESTON (MODEL 799) INSULATION TESTER

● A compact, one-hand operated insulation tester . . . range .1 to 10,000 megohms . . . easily read scale . . . test potential less than 50 volts d-c. Ideal for testing electrical components, devices, materials, and new and existing installations. Details from the WESTON representative near you, or write for bulletin.

Weston *Instruments*

Weston Electrical Instrument Corp., 577 Frelinghuysen Ave., Newark 5, New Jersey

Albany·Atlanta·Boston·Buffalo·Chicago·Cincinnati·Cleveland·Dallas·Denver·Detroit·Jacksonville·Knoxville·Los Angeles·Meriden·Minneapolis·Newark·New Orleans·New York·Philadelphia·Phoenix·Pittsburgh·Rochester·San Francisco·Seattle·St. Louis·Syracuse·In Canada, Northern Electric Co., Ltd., Powerlite Devices, Ltd.



Electric Wiring gets overloaded, too!

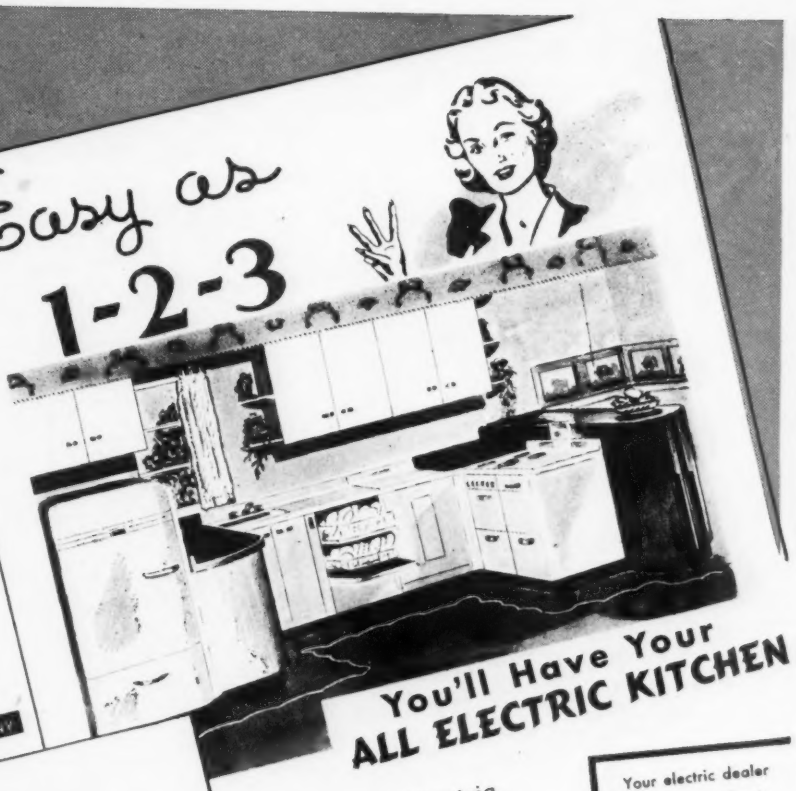
In planning your new home, be sure to include enough convenience outlets for all the lamps and wonderful new electrical appliances you'll be using in the future.

Three or four attachments to one outlet is an invitation to blown fuses or inefficient operation...for an outlet can carry just so much electric current.

Your architect or contractor will advise you that you must plan to spend at least 4% of your total budget for a new home for adequate wiring. *Prepare* for the future . . . and you won't be saying "I'd like a home freezer, but my wiring is overloaded."

SAN DIEGO GAS & ELECTRIC COMPANY

Easy as 1-2-3

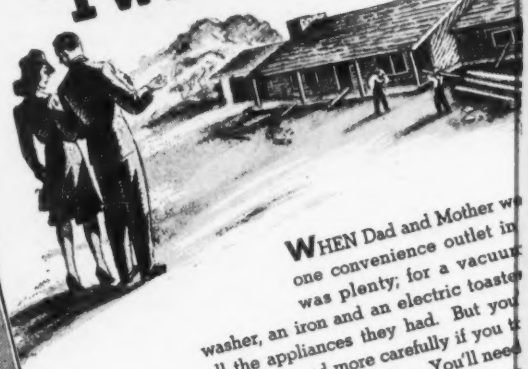


You'll Have Your ALL ELECTRIC KITCHEN

dream of an All-Electric
can become a reality
its purchase

Your electric dealer will help you plan to make your kitchen a 1946 model . . .
to make your

DON'T BE AN "I WISH WE HAD"



WHEN Dad and Mother we
one convenience outlet in
was plenty; for a vacuum
washer, an iron and an electric toaste
all the appliances they had. But you
you'd planned more carefully if you t
outlet per room do today. You'll need
ience *outlets* for the fine new appliance
showing now.. and you'll need ever

So lay your wiring plans carefully
...getting the advice of you
architect and contractor. Adequate w
ing will cost about 4% of the total amo
you are planning for construction.

Prepare for the future . . . a
won't be saying . . . "I wish we ha

Write for Free Home Wir
Wiring Dept. • P.O

Helping San Diego Contractors and Appliance Dealers Promote *Electrical Living*

BELIEVING that homes of the future will need more wiring . . . more convenience outlets than our present homes, and that the easiest time to install this wiring is when the home is being built or remodelled, our current advertisements in the San Diego area newspapers are calling attention to this need.

Reader response to free booklet offers on home wiring, as well as recent surveys, indicated unusual interest in the subject.

REDDY KILOWATT Your Electric Servant

SAN DIEGO GAS & ELECTRIC COMPANY

CHROMALOX

TRIANGULAR RANGE UNITS

Fit any Make or Size Electric Range

A screw driver is all you need to install CHROMALOX *Triangular* Range Units. With just two unit sizes, and Adaptor Rings, you can service all range openings.

CHROMALOX *Triangulars* are profitable and easy to sell. Housewives prefer the speed, easy cleanability, economy and long-life built into CHROMALOX *Triangular* Range Units.

Extra volume and added profits are yours when you feature CHROMALOX *Triangulars* for electric range replacement. Write today for full particulars.

CHROMALOX SELLING ADVANTAGES

- **Ever-level Cooking Surface**
- **Sheathed in "Inconel"**
- **Exclusive Surface Pattern**
- **Two Cooking Areas**
- **All Parts Easily Cleaned**

on new ranges and for replacements

CHROMALOX

RC-15

means ELECTRIC Cooking at Its Best!

EDWIN L. WIEGAND COMPANY • 7540 THOMAS BOULEVARD, PITTSBURGH 8, PA.

MONTGOMERY BROS., 1122 Howard Street, San Francisco 3, Calif.; 911 Western Ave., Seattle 4, Wash.; 2333 N. W. Westover St., Portland 10, Oregon; 741 E. Eighth St., Los Angeles 21, Calif.; THE PETERSON CO., 1921 Blake St., Denver 2, Colo.

Sports Floodlight (624)

The sports floodlight designed by General Electric for the Yankee Stadium has been designated as Type L-69 and is adaptable for sports fields and recreation areas requiring 750- to 1,500-watt lamps. The front door glass is an integral part of the reflector and access to the interior is by unfastening two toggle latches and lifting the aluminum socket housing from the reflector. The housing may be removed without disturbing the position of the reflector and latches are positioned to prevent improper remounting. A clip on the side of the housing allows the removed assembly to be attached to the trunion bracket. A blade sight on the reflector and notch sight on the housing are provided for aiming the center of the beam when adjusting for coverage. A pointer and degree scale provide for daytime setting. Total movement, both in elevation and azimuth, is 180°. Weight with lamp is 19 lb.

Reflector Floodlight (625)

The new Wabash-Birdseye sealed-silver reflector floodlight was designed primarily for supplementary commercial lighting, store interior and display lighting. The light beam is concentrated between a 0-60° zone and feathers away to a soft diffusion at the edges. The bulb is 5 in. in diameter at its widest point, is 6½ in. long, can be used in any standard socket, swivel type or ceiling recessed fixture. Four sizes are available, 100, 150, 200 and 300 watt. Average burning life is 1,000 hours.

Table Lamps (626)

An addition to the Railly line is a series of table lamps in modern and period designs. The Lucerne, one model in the line, has a Plexiglas base and columns, white die-cast metal mounting, white rayon shade with eggshell and silver braid trim. The line also includes Louis XVI adaptations with china bases; table lamps with glazed pottery vases and heavy parchment shades; some glass vases.

F Tubes (627)

Designed for applications requiring a light source warmer than standard 6,500° daylight and cooler than standard 3,500° white, fluorescent 4,500° white lamps have been added to the Sylvania line in 40-watt T12 and 100-watt T17 sizes. Initial ratings for the new lamps are 50 lumens per watt for the 40-watt size and 40 lumens per watt for the 100-watt size.

Flood and Spot Light (628)

A combination area flood and spotlight made by Revere has a reflector 20 in. in diameter and available in steel, porcelain enameled or Alzak aluminum. The socket housing is a combination casting, comprising the mounting base and supporting arms. The arms have a wire-way to serve the floodlight or the units mounted on top. An ornamental ball is used on top if floodlights are not used. Top floodlights of 150-200 or 300-500 watts can be mounted single or tandem.

Triangular Floodlight (629)

Revere is making a triangular floodlight for corner locations. The area which it covers is controlled by means of a telescoping arm which provides for vertical adjustment of 37° and a total horizontal range of 360°.

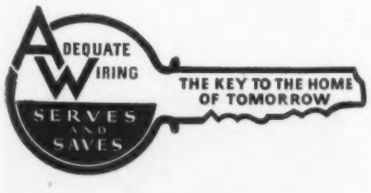
ADEQUATE WIRING INCLUDES... "Mains to Meters"

It's fine business, of course, to talk to your customers about installing adequate wiring in their homes; explaining to them that without adequate wiring they can't use efficiently the modern appliances that this glittering, new postwar age promises them.

But if the service entrance cable to their homes isn't big enough to carry the probable connected load, then there is no use talking about these shiny, new appliances.

If the feeder line carrying power to the service entrance cable is now operating so close to capacity that additional load would cause excessive voltage drop, then you should replace those cables with larger ones.

In other words, it's fine to talk about the other fellow doing a job of adequate wiring, but how about you? Have you got an adequate wiring job? If you need larger feeders or if your customers need larger service entrance cables, then come to Simplex and be sure of getting the best.



SIMPLEX

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

For a good many years, transmission engineers thought largely in terms of non-ferrous materials for static wires. Yet at the same time these wires were installed on galvanized-steel towers with galvanized-steel fittings, the life of which was limited by the available zinc-coating weight.

Although this practice is still being followed in places, engineers are more and more swinging to bethanized steel strand for "overhead ground" or static wires. The advantages of steel for this purpose are numerous. In the first place, it is much less expensive than non-ferrous materials. With a steel line, too, you have fewer separation troubles—for steel is stronger and therefore sags less. And when it's a Bethlehem static wire, you get the long-term savings made possible by the bethanized coating.

Bethanizing is an exclusive Bethlehem process that applies a smooth, uniform, durable coating of zinc to every wire in the strand. The zinc, which is of high purity, is bonded directly to the steel; there is no intermediate layer of brittle zinc-iron alloy.

Bethanized coatings are available in A, B, and C weights, the choice depending upon corrosive conditions in your particular area. Even with the heaviest coating (C weight), bethanized strand is far more economical than any non-ferrous static wire —AND, with either a B or a C coating, its life expectancy may frequently exceed that of the towers and fittings.

BETHLEHEM PACIFIC COAST STEEL CORPORATION
General Offices: San Francisco

Sales Offices: Seattle, Portland, San Francisco, Los Angeles, Salt Lake City, Honolulu

Steel Plants: Seattle, South San Francisco, Los Angeles

BETHLEHEM PACIFIC

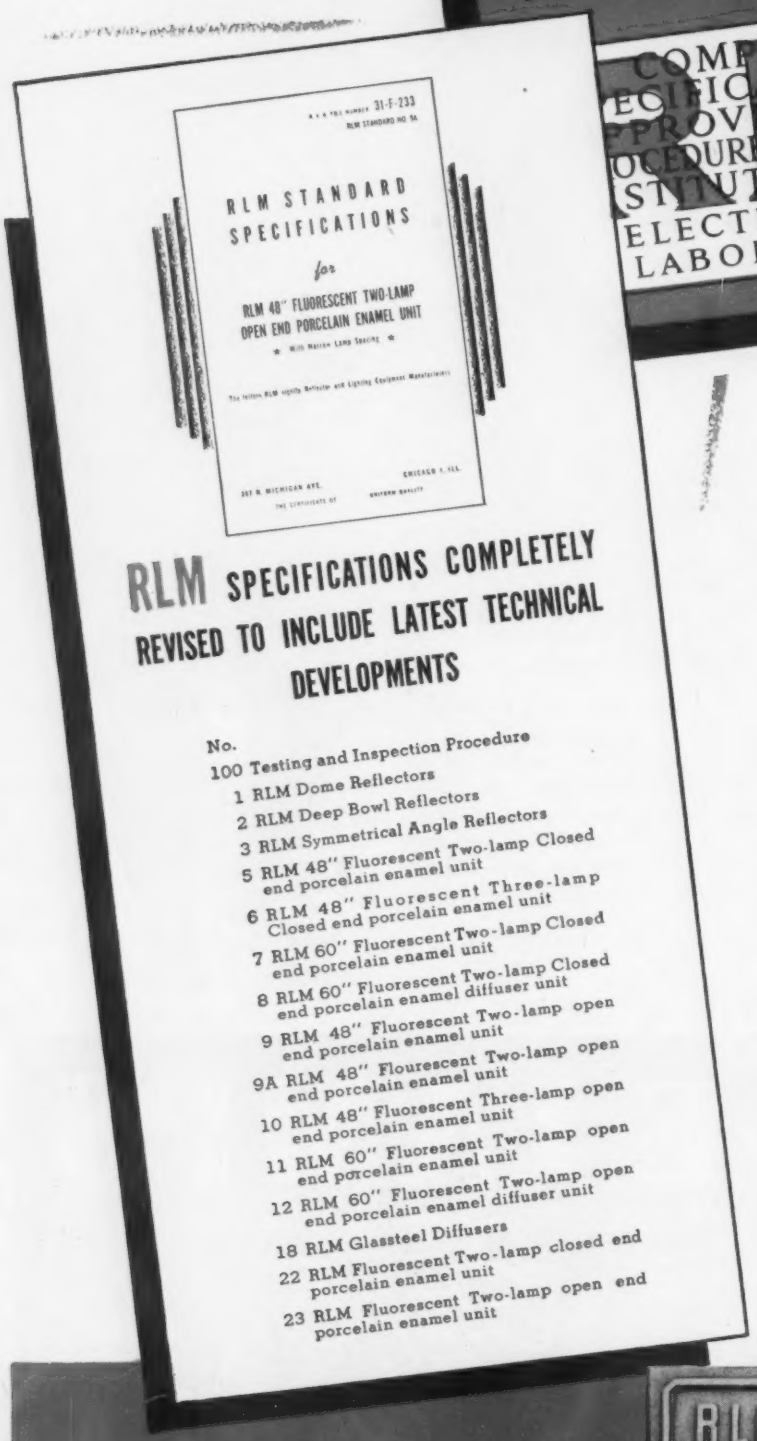
BETHLEHEM STEEL

Here's a "Best Seller" you'll never stop reading

"3 A's OF STORELIGHTING" is General Electric's brand-new, fact-packed book for everyone who sells lamps and lighting. It's a quick-reference book with all the up-to-the-minute data on modern sales lighting...a pocket-size engineering manual that answers dozens of technical questions about lighting applications, equipment and installations.

CHANCES ARE that not every lighting salesman will neglect his best girl, stay up nights, or grab his lunch on the run to read the "3 A's of Store Lighting." But you'll get a sharp surprise when the count is in. Because this handy book gives salesmen the facts... clear, concise and accurate. It shows how lighting sells merchandise; gives tangible examples; demonstrates new design ideas; and contains a host of basic data on lamps and lighting equipment.

DON'T LOSE TIME! Advance reports say "3 A's of Store Lighting" will be the book-of-the-year for lighting salesmen. It's a book you can't afford to miss... a book you'll use often and profitably. It costs only 50c a copy. Call or write your nearby G-E Lamp Office for a copy NOW...better do it today!



RLM SPECIFICATIONS COMPLETELY REVISED TO INCLUDE LATEST TECHNICAL DEVELOPMENTS

No.
100 Testing and Inspection Procedure
1 RLM Dome Reflectors
2 RLM Deep Bowl Reflectors
3 RLM Symmetrical Angle Reflectors
5 RLM 48" Fluorescent Two-lamp Closed end porcelain enamel unit
6 RLM 48" Fluorescent Three-lamp Closed end porcelain enamel unit
7 RLM 60" Fluorescent Two-lamp Closed end porcelain enamel unit
8 RLM 60" Fluorescent Two-lamp Closed end porcelain enamel diffuser unit
9 RLM 48" Fluorescent Two-lamp open end porcelain enamel unit
9A RLM 48" Flourescent Two-lamp open end porcelain enamel unit
10 RLM 48" Fluorescent Three-lamp open end porcelain enamel unit
11 RLM 60" Fluorescent Two-lamp open end porcelain enamel unit
12 RLM 60" Fluorescent Two-lamp open end porcelain enamel diffuser unit
18 RLM Glassteel Diffusers
22 RLM Fluorescent Two-lamp closed end porcelain enamel unit
23 RLM Fluorescent Two-lamp open end porcelain enamel unit

Practical Guides for Men who buy or sell INDUSTRIAL LIGHTING EQUIPMENT

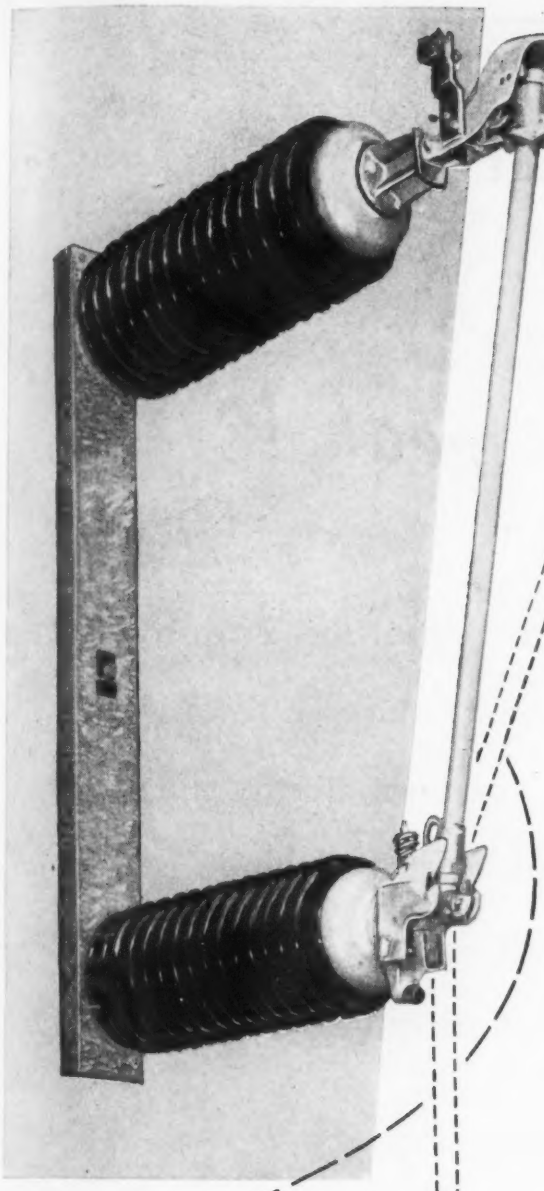
When making plans for industrial lighting to take advantage of the latest developments in illumination engineering, play safe by specifying industrial lighting units built to conform to up-to-the-minute RLM specifications and identified by the RLM LABEL.

Every industrial lighting unit qualified to bear the RLM LABEL must conform to rigid RLM Official Standard Specifications that cover construction and performance factors vital to safety, lighting efficiency and economy. That is why it is so worthwhile to follow RLM Specifications in specifying, and to look for the RLM LABEL when buying Incandescent and Fluorescent industrial lighting equipment.

Copies of all the latest RLM Specifications, listed at left, may be secured through any manufacturer using RLM inspection and certification service, or direct from RLM Standards Institute.

The Letters RLM Stand for Reflector and Lighting Equipment Manufacturers

RLM STANDARDS INSTITUTE
INCORPORATED
307 N. MICHIGAN AVE. • SUITE 420 • CHICAGO 1, ILLINOIS



1

After clearing a fault the fuse tube moves to the open position removing it from the circuit and providing a clear "semafor" signal that the fuse has been blown.

2

In the case of 69 kv fuse—following operation—the fuse tube is moved with a switch stick from the restrained position to the full open position for removal from the mounting.

3

Lifting out the blown fuse with a hook stick permits refilling conveniently and easily, with the S&C Type SSM Refill Unit.

The short circuit interrupting rating of the unit illustrated is 4000 r.m.s. amperes at 66,000 volts. Correspondingly high interrupting ratings at other voltages.

This is the S&C Type

"HSO"

...the most modern power fuse.....with "drop out" feature advantages .....

The S&C Type HSO protective unit combines high interrupting capacity with the added protection afforded by "drop out" action after fault current interruption. A blown fuse is out of circuit, and is readily distinguishable at considerable distance.

In the HSO Power Fuse assembly high interrupting capacity results from the proper design of a boric acid arc extinguisher unit. The "drop out" mechanism is sleet protected, and, in the higher voltage ratings, is also equipped with a snubbing device which prevents any mechanical damage which might occur in a full swing to open position.

A number of the larger power companies have already applied the S&C Type HSO Power Fuse extensively with marked success and satisfaction. Let us send YOU full information . . . NOW!

Schweitzer & Conrad, Inc.

4425 RAVENSWOOD AVE., CHICAGO 40, U. S. A.

Represented in Principal Cities (Consult Telephone Directory)
In Canada by Powerlite Devices, Ltd., Toronto, Ont.

What does this Mark mean to you?

Everyone knows that the Virden "V" stands for good value in lighting fixtures . . . that's an idea that has been accepted straight across the board for many years and sustained by continuous performance. But the Virden "V" also stands, of necessity, for everything that makes the good value possible.

What are some of these things?

Research is one. This embodies analysis of the market from the standpoint of style, measurement of the rhythm and tempo of design; and analysis of the various geographical segments of the U. S. from Maine to California, from the Canadian line to the Gulf, in terms of architectural value, needs, wants.

Styling is another. We have suggested some of the style influences in the preceding paragraph on research. These have to be interpreted in form and pattern by our designing department and there studied from the standpoint of available materials, metals, plastics, glass. The models must then stand up under the four critical tests of: (1) eye appeal; (2) convenience and ease of operation; (3) ease of application—minimum of work in assembly; (4) efficiency in terms of good illumination.

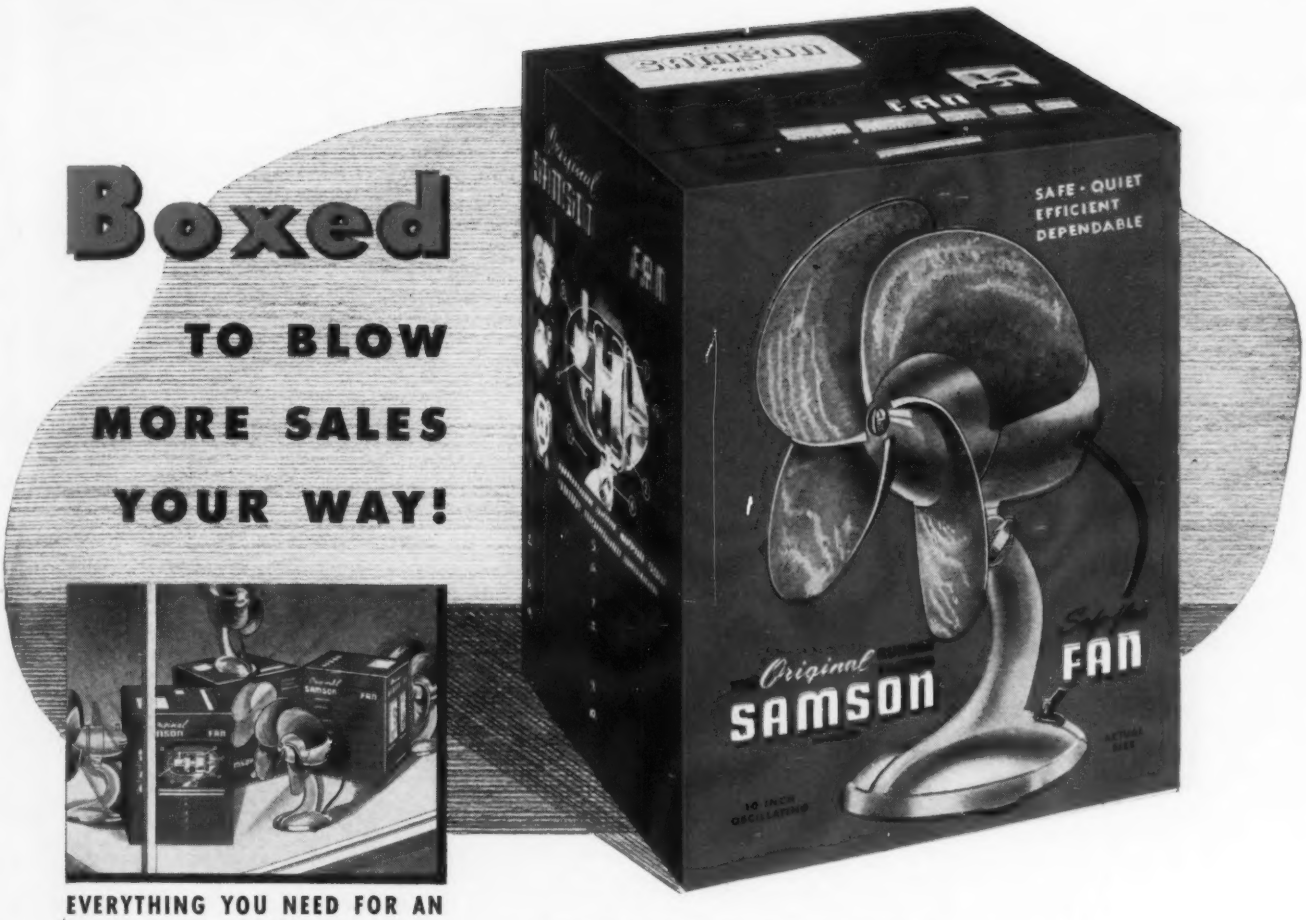
Production. The essence of our business is mass production of high quality lighting fixtures on a basis where careful planning and the most modern production equipment, combine with skilled labor to produce popular items at reasonable prices. The Virden "V" stands for maximum dollar-and-cent value.

Contractors and builders look for the Virden "V" on the package and find its presence there an assurance of complete satisfaction and reliable service.

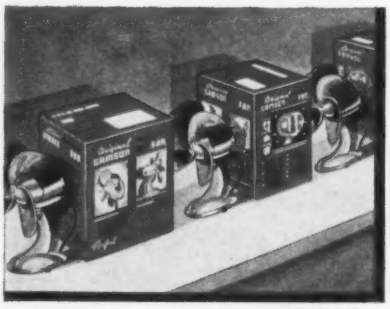
The John C. Virden Company • Cleveland, Ohio

Member American Home Lighting Institute

Boxed TO BLOW MORE SALES YOUR WAY!



EVERYTHING YOU NEED FOR AN EYE-CATCHING WINDOW DISPLAY



A "NATURAL" FOR A SELF-SELLING COUNTER, SHELF OR TABLE DISPLAY

AGAIN SAMSON BRINGS YOU a package that keeps pace with the product! This time it's the colorful display box that houses every SAMSON Safe-flex Fan . . . a box that pictures and describes the fan's advantages . . . that means business even when there's no salesman nearby.

Use these handsome, fact-telling boxes to build an eye-catching window display. Use them for a counter, table or shelf display. Either way you'll have a "traffic stopper" that will automatically blow extra sales and profits your way.

Don't forget, too, that SAMSON Safe-flex is the *original,* patented Rubber Bladed Fan. Its flexible rubber blades need no shield, yet will not harm even a child's fingers. Its improved design and construction, including the Samson-built precision-quality motor, assure even greater quietness, efficiency, and trouble-free operation. And its new styling gives it beauty that blends with the decorative scheme of any home or office.

SAMSON UNITED CORPORATION

ROCHESTER 10, N. Y.

Samson United of Canada, Limited, Toronto

looking down a Hole with the help of *Resinite*

Insulated Wire

Geologists have long looked at core drillings in their work, many times wanting to examine the hole itself. Recently, such an optical device was perfected, using a high voltage lamp on the end. Resin Industries worked on the problem of insulating the wire, and again a RESINITE compound was the answer.

MAXIMUM
dielectric strength . . .

MINIMUM
size in insulation . . .

Our engineers are ready to assist you in your insulating problems. A letter, outlining your needs, will start our research department working toward the answer.

RESINITE insulating tape and tubing in stock sizes. Send for booklet showing complete listings.

RESIN INDUSTRIES
SANTA BARBARA · CALIF

BULLETINS

data books, etc.

Motor Starters (630)

Allis-Chalmers Type H motor starters are described in a bulletin prepared by the company. Type H starters are said to provide complete protection for men, motors and equipment. They can be used with squirrel-cage, wound rotor and synchronous motors ranging up to 700 hp., at 2,300 volts and 1,250 hp. at 4,160 or 4,600 volts.

How to Plan Lighting (631)

In an eight-page illustrated pocket-sized booklet, entitled "How to Get the Most from Fluorescent Lighting," Day-Brite Lighting Inc. tells what to look for and what to avoid in planning an installation. A 13-point check list is an aid to choosing fixtures for maximum efficiency at minimum operating and maintenance expense.

Relays (632)

An eight-page bulletin on heavy-duty relays is available from Ward Leonard Electric Co. Data are given on terminals and enclosures, single- and double-pole relays, 3- and 4-pole relays, double-throw 1-, 2- and 3-pole relays, mechanical latching relays with and without interlock contacts, double-throw, transfer relays.

Home Electrification (633)

Of interest to consumers, architects and contractors is a 12-page illustrated booklet in which Westinghouse lists four degrees of home electrification—thrift, budget, ideal and deluxe. Basic major electric equipment and minimum wiring requirements and specifications are given for each degree.

Transformer Loading (634)

How to use one bank of transformers to supply two different loads is told in an article by O. T. Farry, Wagner Electric Corp. engineer, published in pamphlet form by the company. This article shows a number of connection combinations and explains how to determine the size of each transformer required. Construction and use of vectors is explained. Seven typical problems are discussed and each is solved by approximate formula and by vectors.

Electronic Articles (635)

Solar Mfg. Co. is distributing the first issue of its new "Solar System," a bimonthly publication for electronic engineers, servicemen, radio amateurs, laboratory technicians and students. This publication will carry illustrated articles on electronic problems and developments, with special attention to capacitor applications.

Dust Collector (636)

Ideal Industries gives data on its dust collector in a four-page folder recently off the press.

Indicating Devices (637)

Containing application information for users of electrical indicating instruments, "Weston Engineering Notes" is being distributed by the company. The first number of this publication, which probably will be issued as a bimonthly, featured articles on the galvanometer and the bridge and copper oxide rectifiers as used in measuring instruments.

Wire Data (638)

In a four-page data sheet, Sixplex lists properties of Plastex, its wire and cable having thermoplastic insulations or jackets of the polyvinyl-chloride type. The folder shows ten colors of Plastex wire and gives data in question and answer form. An engineering table lists physical and electrical properties under varying temperature conditions.

Instruments (639)

Norton electrical instruments, including ammeters, voltmeters and wattmeters, switchboard and portable types, are described in a recent publication.

Tubes (640)

Essential characteristics and ratings of General Electric and Ken-Rad receiving tubes are given in two new publications prepared by the G-E tube division.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

600	601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620	621
622	623	624	625	626	627	628	629	630	631	632
633	634	635	636	637	638	639	640			

Name . . . . . Company* . . . . . Title* . . . . .

Address . . . . . .

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

UNIVERSAL CLEAN-AIR CLEANER

UNIVERSAL's Clean-Air Cleaner is America's leading Tank Type Vacuum Cleaner and it's backed by large scale national advertising. Built for three dimensional cleaning with 13 attachments—Clean-Air is the dealers' first choice for sales appeal. For beauty of design and perfection of performance, it's Clean-Air—the Universal Vacuum Cleaner with the "Tattle-Tale" Light—sells on sight.

FIVE FAMOUS FEATURES!

EXCLUSIVE "TATTLE-TALE" LIGHT—Red light flashes when dirt bag needs emptying.

EXCLUSIVE THREAD-PICKING NOZZLE—Designed to permit use of much more powerful suction—cannot drag or seal.

GERM TRAP FILTER—Thoroughly cleans and purifies the air.

HANDY TOE SWITCH—Motor responds to gentle touch of toe on switch—eliminates stooping.

13 ATTACHMENTS & STORAGE KIT—New kit hangs or stands in closet.

UNIVERSAL
Universal Electrical Appliances distributed in Canada exclusively by Northern Electric Company, Ltd.
LANDERS, FRARY & CLARK • NEW BRITAIN, CONN.
LEADERSHIP THAT BUILDS YOUR DEALERSHIP!

It will pay you to know the answers to these questions about

What "Certified" means on a ballast

Q. *What's behind the idea of the Certified Ballast Manufacturers?*

A. The best engineering brains in fluorescent lighting drew up a set of exacting specifications for ballast manufacture—plus testing procedure—to insure satisfactory lamp performance, dependable fixture operation, minimum service worries.

Q. *What does "Certified" actually stand for?*

A. Ballast manufacturers build their products to the specifications . . . submit random factory samples to impartial Electrical Testing Laboratories, Inc., of New York. The laboratory tests and checks the ballasts to the specifications. If the ballasts meet all tests, E.T.L. CERTIFIES them—permits the manufacturer to use the ETL Certification label on his product.

Q. *How about this "testing"?*

A. Independent testing by ETL is a searching, exacting procedure. It covers such vital points as heating, noise, radio interference, lamp operation, wiring, power factor and many others. And ETL inspectors *recheck* samples weekly at the various factories . . . to guard quality.

Q. *What are the benefits to the trade?*

A. It is assurance that tubes and fixtures will perform and operate to their fullest capacities. It is important to note that leading fluorescent tube makers will guarantee lamp performance when Certified Ballasts are specified in fixtures.

Q. *What are the benefits to the user?*

A. Certified Ballasts help assure the user of good lamp performance, good fixture operation, and a minimum of maintenance worries. Light-for-selling depends on reliable day-in-day-out service. That's why the use of Certified Ballasts is a sound, easy way to protect yourselves and your customers.

Certified Ballast Manufacturers

Makers of Certified Ballasts for Fluorescent Lighting Fixtures

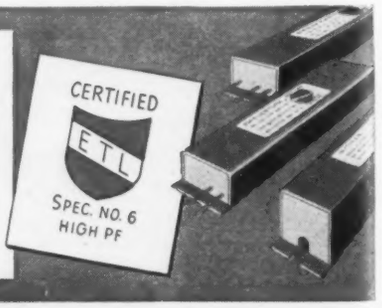
CHICAGO TRANSFORMER CORP.
3501 Addison St., Chicago, Illinois

GENERAL ELECTRIC CO.
Specialty Transformer Division
1635 Broadway, Fort Wayne, Ind.

JEFFERSON ELECTRIC CO.
Bellwood, Illinois

SOLA ELECTRIC CO.
2525 Clybourn Ave., Chicago 14, Illinois

WHEELER INSULATED WIRE CO.
378 Washington Ave., Bridgeport, Conn.



IN THE PUBLIC'S INTEREST—
but not in its eye

HERE are the successors to the radial-wave reflector—two new G-E suburban reflectors that now bring scientific light distribution to the lighting of residential streets. Light formerly dissipated in non-useful directions is utilized to better advantage. Direct glare is greatly reduced. Uniformity of illumination on the road is much improved, yet installation and maintenance are easy.

Two types—open and enclosed—using series lamps of 1000- or 2500-lumen rating are available with adapters to fit practically any fixture that takes the standard-dome radial-wave reflector. They may be installed either as unit-for-unit replacements to provide better light distribution, or in accordance with I.E.S. Recommended Practice to obtain specified illumination levels at low cost.

These G-E suburban reflectors offer utilities an inexpensive way to improve suburban lighting in their communities and to keep that lighting at high efficiency for years of low-cost service. Why not check the features listed here, then ask your local G-E representative how these reflectors can fit into your suburban streetlighting plans? *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

SCIENTIFIC LIGHT CONTROL

A highly efficient light distribution pattern effectively utilizes much of the light ordinarily wasted in producing objectionable glare and illumination of house fronts.

HIGHER LIGHTING LEVELS

When equipped with the new G-E 2500-lumen lamp of 5 3/8-inch light-center length and spaced as recommended, I.E.S. Standards for suburban lighting can be readily met.

USE TWO WAYS

1) *In existing installations* as unit-for-unit replacements for radial-wave reflectors.

2) *In new installations* to provide higher lighting efficiency and more uniform illumination.

LOW MAINTENANCE COST

Alzak-processed aluminum reflectors retain high efficiency for years under all weather conditions, and are easily cleaned when necessary. Enclosed type has refractor spun-sealed to keep out dirt and to practically eliminate breakage.

(a) Form 79 CR luminaire with enclosed suburban reflector. Simple latches and safety chain facilitate relamping.

(b) Form 45 L luminaire with open suburban reflector. Either one or two shields may be easily attached if needed.

Are you tieing in with the NEMA plan to give America better street lighting?

Good Street Lighting
BUILDS GOOD WILL

STREET LIGHTS *for better seeing*

GENERAL ELECTRIC

452-39-3010

MONARCH'S DEEP-HEET COOKER IS DIFFERENT

SIDE HEAT

Monarch builds the only cooker with SIDE application of heat. Side heat maintains uniform temperatures top to bottom. Cooking is faster — tenderizing is more thorough — food is baked, not stewed. It makes a real DIFFERENCE!

A 2½ lb. whole chicken, or 5 lbs. of jointed chicken, can be dry roasted to a tender, even brown.

If "weenies" and sauerkraut are on the menu, here is a clever way to cook it — a natural for "side-heet."

Yes, it even bakes an angel food cake — just the right size for one meal. And is it delicious!

ACTUALLY, Monarch's *"Deep-Heet"* Cooker is a small surface OVEN. It saves using the regular large oven for many baking operations. Women instantly grasp the advantage of side heat application — understand why it is more efficient than bottom heat. Thus it is easy for Monarch dealers to capitalize on this exclusive electric range feature. Standard equipment on Model F156PC.

MALLEABLE IRON RANGE CO.
3966 Lake Street Beaver Dam, Wis.

If it's a Side-Heat Cooker . . . it's a MONARCH!

RANGES AND HEATERS
Monarch-Paramount
COAL WOOD ELECTRIC GAS and COMBINATION RANGES

This brilliantly styled new Railley table lamp has a gleaming column and block of genuine Plexiglas, hand-carved to create a fascinating frosted flower effect. Mounted on a polished white metal base, it has a white-lined, hand-sewn rayon shade, with white and silver trim, and is topped with Plexiglas finial. This is but one of many smart new Railley lamps that are creating conversation . . . and sales.

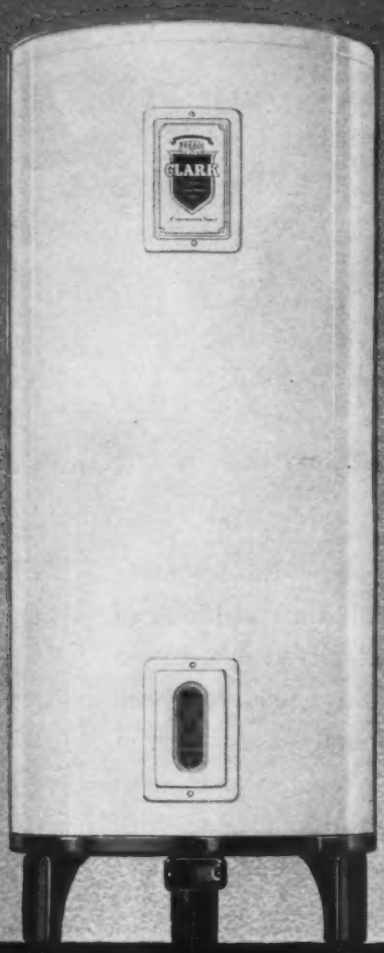
See this and other new Railley developments at the July Lamp Show, Space 12-113 Merchandise Mart, Chicago.

Railley
CORPORATION · CLEVELAND, OHIO
ORIGINATORS OF THE
PIN-IT-UP LAMP*
*Reg. U.S. Pat. Off.

NEW ADDRESS: 12910 Taft Avenue • Cleveland 8, Ohio

Presenting

A Great New CLARK Electric Water Heater Featuring the Remarkable New CLARK "IONODIC" System of Anti-Corrosion Protection



For Complete Details We Suggest that You See Your Jobber or Write for Our Descriptive Folder.

Form No. 202

CLARK

A Toastmaster Product

CLARK

The Greatest Name in Electric Water Heating

McGRAW ELECTRIC COMPANY, CLARK WATER HEATER DIVISION, 5201 W. 65th ST., CHICAGO

ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

June
1946
©

Maybe it's a token of their good intentions, but some manufacturers have begun to ship out radio sets without tubes and washing machines without motors. The idea is that maybe the distributor or dealer can bird-dog enough from local stores or stockpiles, or from his own basement to equip them and sell the things. But what a pricing problem that presents! It is certainly inviting a long argument with the OPA--and who pays for that time consumed?

Fill ins needed

Prices for fractional horsepower motors got a flat 27% increase over those of before the 9% increase of last October. This also applies to renewal parts, accessories and factory rebuilt jobs.

Motors

Telechron, no longer "Warren", didn't notify us in time to correct our listing in the April annual directory. Representatives in the West are J. H. Blinn, Sugar Bldg., Denver, for the Rocky Mountain states, Joe C. Platt, 1411 Fourth Ave., Seattle for the Northwest, and Joe J. Burns, Western Merchandise Mart, San Francisco, for California, Arizona, Nevada and Hawaii.

About time

Westinghouse is beginning to move some merchandise West after its long strike. This is good news for its franchised dealers.

Ah!

Small appliances and small space heaters were given a 9.3% price raise which retailers can pass on. It means about a 4% rise in retail prices.

Up

Now that the railroads have their strike out of their system and freight is moving West again, the quantity of appliances being received continues to improve. It is not yet in such quantity as to satisfy all demands but even some of the strike-bound plants of but a month or two ago are beginning to roll out merchandise.

Don't look now

The C. G. Hamilton Co. with offices in Western Merchandise Mart has been appointed Pacific Coast representative for Freed Radio Corp. of New York, makers of the Freed-Eisemann line. All models will have an F-M band in them.

Appointed

Back-door selling, most dealers say thankfully, has been ruled out by nearly all the distributors and wholesalers. In this time of scarcity of appliances the latter have been especially anxious to see that their dealers get all the merchandise available to sell to keep afloat. Dealers say they hope the habit will become permanent. — No back doors

When Aviola moved from Glendale to Phoenix, its northern California distributor, Federal Appliance Distributors, took over the former Glendale factory as headquarters for exclusive Aviola distribution in California. The Oakland office will continue as the northern California headquarters. J. M. Stewart, vice president and general manager of Federal will make his office at Glendale. — Musical chairs

Table television sets, says Printers Ink, once predicted to sell around $100 will cost more like $140 before they arrive. So's your old dollar. — Vide-up

Thermador is expanding again, adding 7200 sq.ft. to its plant to house expanded portable electric heater and evaporative cooler manufacturing. Celebrated the 30th anniversary of its first Everhot electric water heater last month too. — Still at it

Appliance Wholesalers, the Philco distributor in Portland, has now moved into larger quarters at 600 N.W. 14th Ave. Cooped up in temporary quarters during the war it welcomes the added space to handle its other lines, L&H ranges, Horton washers, Knapp-Monarch small appliances and Filter-Queen cleaners. — Can spread now

Saviers, Inc. of Reno has sold its wholesale electric supply and fixture business to Osborne & Kitchen. — Separate

Sylvania, in making its consumer surveys, has found that women buy lamp bulbs for the family and that their regular shopping habits take them to groceries, variety and drug stores each week but to hardware and electric stores only occasionally. — Where they buy

Lots of changing around and fixing up going on at Western Merchandise Mart these days in anticipation of the August 4-8 Market Week. With strikes settled the factory men expect some new models to show and hope to be able to give more satisfying answers as to when. — Busy

Proctor begins the unique "demonstration" campaign for its Never-lift iron this month. Dealers are to advertise and publicize a demonstration of the iron, and thus get into the swing of such technique for when appliances become plentiful again. Those who come into the store are to be urged to try it themselves and thus build up appetite for a quality iron and to be patient to get one. A reservation card for priority listing closes the demonstration and is used to sign up live prospects. — Practice run

Campbell Wood has been appointed works manager of the Nash-Kelvinator Corp. new plant at El Segundo, Calif. Taking over the North American Aviation, Inc., plant near Los Angeles municipal airport, Kelvinator will manufacture refrigerators and ranges for Western distribution from this plant soon. — Comes West

Frigidaire's new Home Freezers were born nearly a quarter-century ago!

There's nothing new about building Home Freezers at Frigidaire. For, 'way back in 1923, Frigidaire first produced a mechanically refrigerated, low-temperature cabinet for storing ice cream. This was the beginning. Since then, Frigidaire has had almost a quarter-century of "know how" in the building of more than *ONE-THIRD MILLION mechanically refrigerated, low-temperature cabinets of all kinds!*

And it was in 1929 that Frigidaire first marketed a low-temperature cabinet designed *specifically* for storing frozen food.

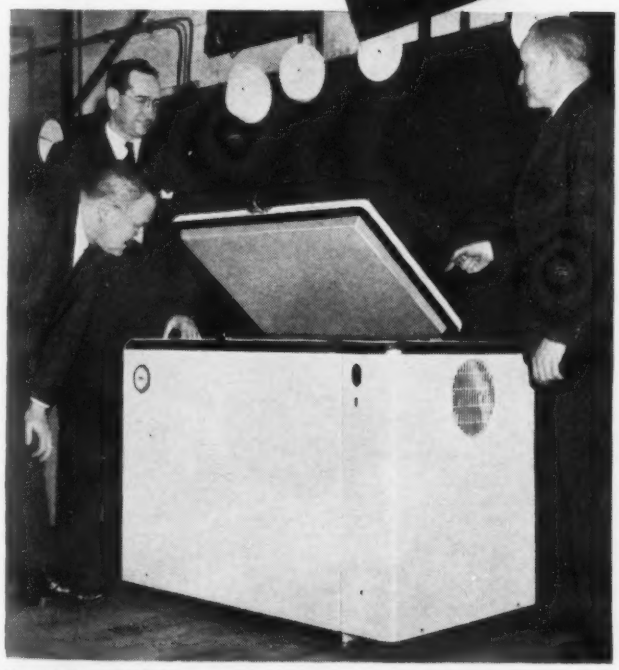
Today's new Frigidaire Home Freezer is the result of those early experiences and the accumulation of the specialized knowledge of low-temperature refrigeration which is needed to build a really *good* Home Freezer. It's the Home Freezer that dealers can sell with full confidence, *knowing* it will do a dependable job with a minimum of service.

In preparation for the marketing of Frigidaire Home Freezers, thousands of actual food tests were made . . . new and better food freezing techniques were developed . . . over a million booklets on the freezing and storing of food were distributed . . . full-color films were shown to thousands of housewives . . . all with the idea of establishing the Frigidaire Dealer as Home Freezer Headquarters in his community.

Thus, the advent of the new Frigidaire Home Freezer is one more example of Frigidaire's thoroughness in doing things. Another proof of Frigidaire's leadership. Another instance where the Frigidaire Dealer and his customers can . . . Depend on Frigidaire To Do Things Right!

Depend on **FRIGIDAIRE** *to do things* **RIGHT!**

First New 4-Ft. Frigidaire Home Freezer comes off the production line as E. R. Godfrey, General Mgr., and P. M. Bratten, General Sales Mgr., get a demonstration from S. M. Schweller, Chief Engineer, on its many features, including the counter-balanced lid which opens at a finger-touch.



New 8-Ft. Frigidaire Home Freezer receives unanimous approval of J. L. Gibson, Mgr. Commercial and Air Condition Engineering, H. M. Kelley, Appliance Sales Mgr., and D. C. McCoy, home freezer authority. They're shown here examining its points of superiority.

1923: Frigidaire Ice Cream Freezers. Note the dome-type, water-cooled compressor. Compare it with today's famous Meter-Miser mechanism.

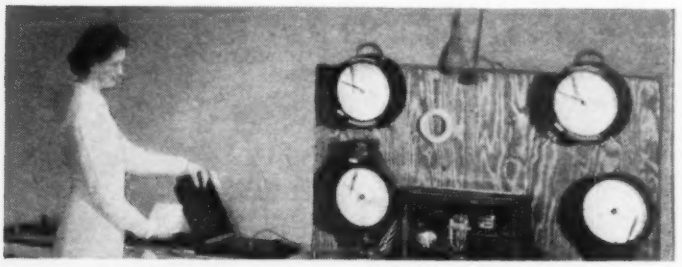
1929. Frigidaire first marketed a low-temperature cabinet designed specifically for frozen food.

1929. Frigidaire first produced a frozen food display case for the storage and display of commercially frozen food.

1934. Locker plants equipped by Frigidaire were among the first to freeze and store home-prepared foods.

1939. Frigidaire first produced a Frosted Food Merchandiser which gained national acceptance in food stores.

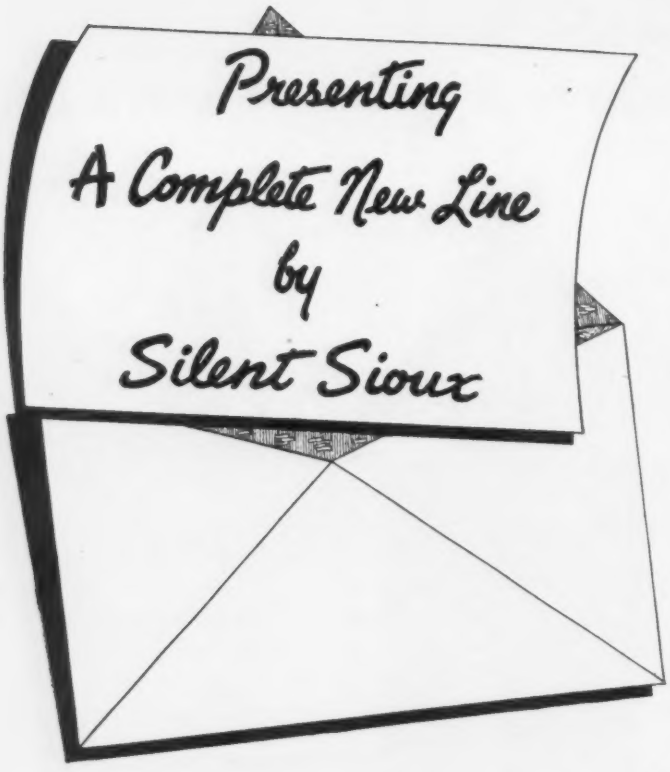
For Nearly a Quarter-Century Frigidaire low-temperature cabinets have been used successfully as home freezers. Today's new Frigidaire Home Freezers reflect this long experience, and offer the consumer better, more dependable, more economical home freezing.

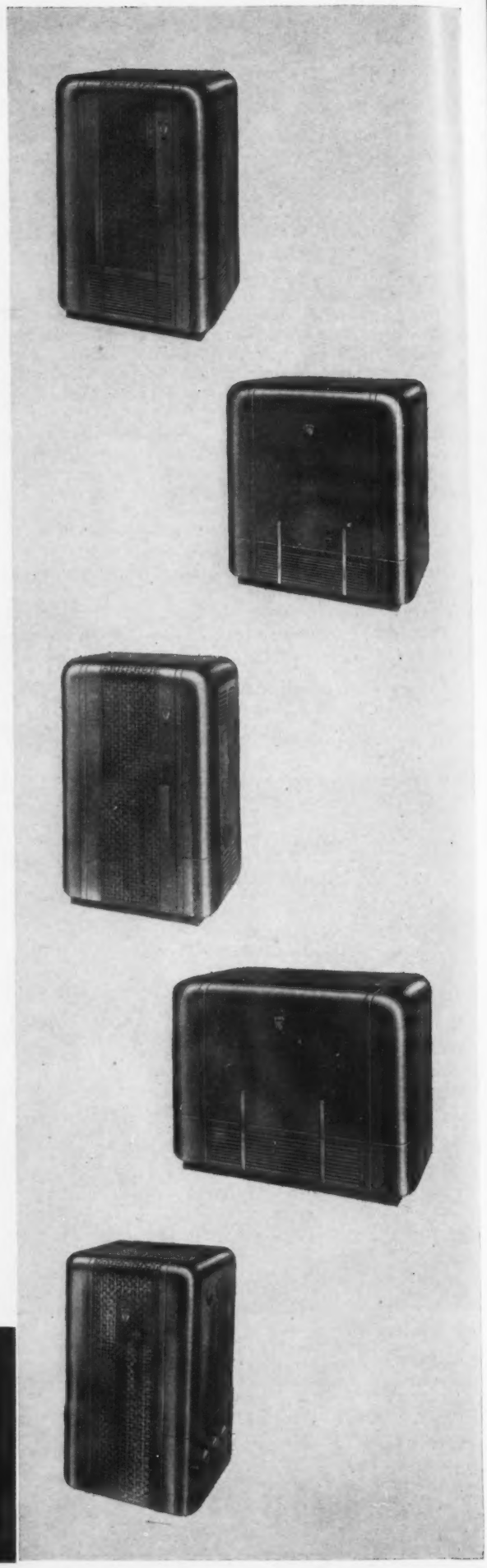


Frozen Food Research is a continuing activity at Frigidaire, with a specially trained staff of engineers, technicians, and home economists who seek new and better ways to wrap, prepare, freeze, and store foods of all kinds. Many of today's accepted frozen food methods have resulted from this research.

You're twice as sure with two great names—

Frigidaire made only by **General Motors**





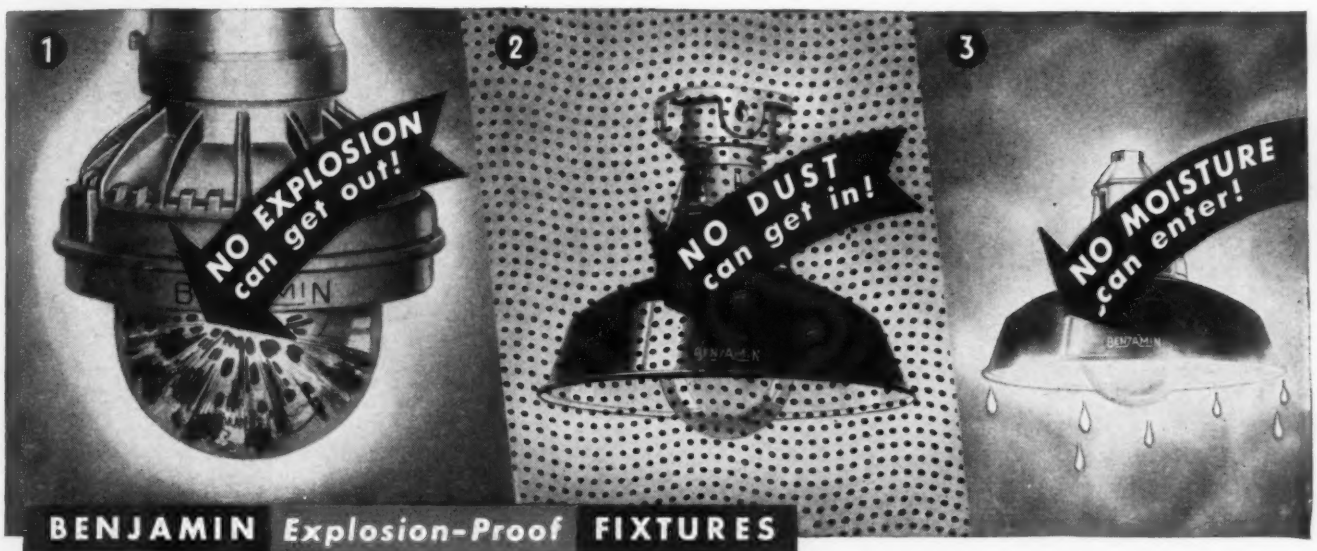
● Yes, Silent Sioux is c... the way again . . . with modern heat in the modern pack.ge. A complete, new line that will appeal to new and old customers alike. Time lost in production has meant time gained in research, and there are months of painstaking research behind every new change, every new model in the Silent Sioux line. The results are new achievements in beauty and efficiency. Yes, beauty and efficiency that will make this one of the fastest selling lines on the market.

● We'd like to say that we're meeting new and greater production schedules, but we can't ignore shortages and they won't ignore us. In our case it's sheet steel, and until it becomes more plentiful, production will be limited. We don't want to lead dealers on with empty promises of early delivery dates, not even for floor models. However, all specifications and illustrations of these new models are available in our new portfolio. So write today for your free copy and see for yourself the many advantages of this new Silent Sioux line. SILENT SIOUX OIL BURNER CORPORATION, ORANGE CITY, IOWA.

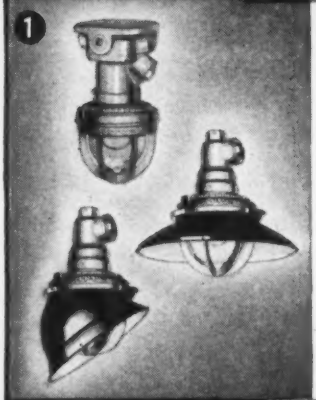
Silent Sioux

PIONEERS IN GOOD HEATING

Important Facts you should Know about Benjamin *Explosion-Proof, Dust-Tight* and *Vapor-Tight* Lighting Equipment



BENJAMIN *Explosion-Proof* FIXTURES

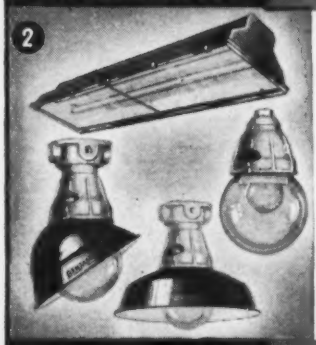


Constructed to:
Confine Explosions Within Fixture.

These units meet the severe spark plug test in which spark plugs are used to create ignition of explosive mixtures within the fixture 30 or more times. Tested also to withstand hydrostatic pressures ranging to 380 lbs. per sq. in. For Class C (Ethyl-Ether atmospheres) a series of 50 additional explosion tests are met. Benjamin units are neither destroyed nor damaged by such tests nor do they permit the passage of flames or dangerously hot gases to escape to the surrounding atmosphere. Further, they pass all tests for operation at safe temperatures below the ignition temperature of the explosive atmosphere.

Uses: Listed by Underwriters' Laboratories for Class I, Group C and D hazardous locations, which include locations where flammable volatile liquids, highly flammable gases, mixtures or other highly flammable substances are used, handled or stored in other than their original containers.

BENJAMIN *Dust-Tight* FIXTURES

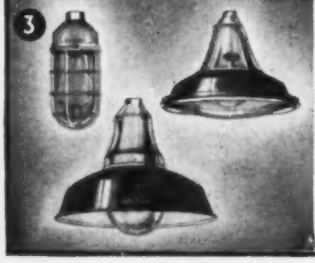


Constructed to:
Prevent Penetration of Explosive Dust to Lamp and Operate at Safe Temperatures.

Tests passed by these Benjamin fixtures include: Dust-Tight Test, 6 cycles of on and off operation at maximum room temperatures in a whirlwind of explosive dust-air atmospheres; Temperature Test, safe operation of fixture when covered with a heavy blanket of ignitable dust; a 35-hour, 2000 r.p.m. Vibration Test.

Uses: Listed by Underwriters' Laboratories for Class II, Groups E, F, G, and Classes III and IV hazardous locations. Includes such locations where the air may become laden with combustible dusts or where easily ignitable fibers are present. Also where dusts may settle upon ordinary fixtures in excessive quantities.

BENJAMIN *Vapor-Tight* FIXTURES



Constructed to:
Exclude Harmful Amounts of Vapor, Gas, Water and Dusts from Interior of Fixture.

These fixtures are highly resistant to penetration of moisture and non-flammable dusts, gases, or vapors. They meet Benjamin's high standards for performance and their dependability is attested to by their years of service throughout industry.

Uses: Listed by Underwriters' Laboratories for Class II, Group G and Classes III and IV hazardous locations. Includes locations where non-flammable gases or vapors are present or where non-combustible dusts exist.

Severe Tests and Years of Service demonstrate Dependability of these Special Benjamin Fixtures

Illustrated here are the three groups of Benjamin fixtures for use in hazardous locations. Fixtures in each group must pass stringent tests for conditions far beyond those found in actual service. Some of these tests are given in the chart at left, together with typical applications for each group.

Benjamin's years of experience in the manufacture and installation of such fixtures give assurance of maximum protection against fires, explosions and lighting interruptions due to hazardous or other abnormal atmospheric conditions. In the solution of special lighting problems involving the use of such equipment, Benjamin's experience and engineering recommendations are available without cost or obligation. Write for Free Data Bulletins containing detailed information concerning all of Benjamin Hazardous Location Lighting Equipment bearing the label of the Underwriters' Laboratories. Address Benjamin Electric Mfg. Co., Dept. J, Des Plaines, Illinois.

BENJAMIN TRADE MARK
HAZARDOUS LOCATION
Lighting Equipment
DISTRIBUTED EXCLUSIVELY THROUGH ELECTRICAL WHOLESALERS

We made our record IN THE AIR by keeping our feet ON THE GROUND...

In the late 20's we shared Lockheed's thrill in their new Vega—our Finishes were on that ship. Today, Lockheed's Constellation is another air-world sensation. She, too, flies with Fuller Aircraft Finishes!

There's more. Fuller Finishes are on the Douglas DC-6, on Consolidated Vultee's Convair and on the Boeing Stratocruiser.

Our continuing leadership in Aircraft Finishes comes directly from our strict laboratory and field procedure on ALL industrial products. This: "Know the *whole* problem to get the *complete* answer."

All Fuller Aircraft Products now are available in any quantity for private use. Inventories on other Industrial Finishes are being increased as rapidly as materials permit. W. P. Fuller & Co. Factories in San Francisco, Los Angeles, Portland; Branches, Warehouses in principal Western cities.

FULLER *Industrial* FINISHES

FULLER PAINTS they last

THE WEST— AMERICA'S NEW INDUSTRIAL FRONTIER

FULLER pioneered in '49; became West's largest, most skilled paint makers. We're still pioneering in '46—with NEW products for our Western Industrial frontier!

MAINTENANCE FINISHES

In the field of factory maintenance, Fuller Color Engineering *puts color to work* . . . increases production profit through better employee safety, morale. Write for new, up-to-minute book, or have Fuller representative call with data.

PRODUCTION FINISHES

Under the pressure of war needs, we telescoped years of research on the problems of Plywood finishing. Today, we feel we lead the field. Whether you're interested in sealing Plywood at a mill or in working out a finishing system in the shop, Fuller can give you the right answers.

MARINE FINISHES

Mr. Boatbuilder: See Fuller! From a plastic laminated hull down to the lowly dory, we've got a finish for every purpose. (For sea-going ships, too!)

MITCHELL brings you

Rad-i-Air

the first complete line of GERMICIDAL EQUIPMENT

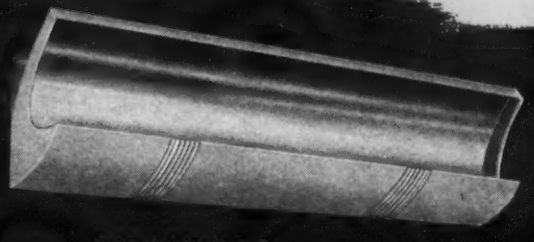
...protects humans and animals against airborne infections ...protects products against contamination and spoilage

Wherever people live, work or congregate indoors . . . wherever animals are housed . . . wherever foods, beverages or medicines are processed, packaged, bottled or sold—there is vital need for the protective benefits of RAD-I-AIR Ultraviolet Germicidal Units! By shortwave irradiation of *maximum intensity* of the germicidal lamp, they kill deadly airborne bacteria, guard against spread of infectious diseases, suppress product contamination . . . with greatest effectiveness, economy and safety.

RAD-I-AIR units are advanced in design . . . sound in conception . . . scientifically perfected. They have already been tested and *proved* under severe operating conditions in homes, offices, stores, hospitals, factories, dairies, on farms, and elsewhere.

Now . . . after years of pioneering development . . . RAD-I-AIR unlocks the door to a huge, untapped market that offers you unlimited sales volume and substantial profits. For, never until now, has a *complete* line of correct, moderately priced, easily installed Germicidal equipment been available. Take the lead in your market—be first with RAD-I-AIR—and cash in on this golden opportunity!

You Get Complete, Abundant Sales Aids . . . Catalogs, Sales Manuals, Folders, Stuffers, Newspaper Mats . . . Everything to help you sell. Write for them now!



RAD-I-AIR U.R.C.
Models No. 921-15 and 921-30
For Personal Protection

RAD-I-AIR ALL-PURPOSE
Models No. 981-15 and 981-30
For Animal and Product Protection

RAD-I-AIR CONVEYOR LINE
Models No. 961-15 and 961-30
For Direct and Indirect Product Protection

RAD-I-AIR BARE LAMP
Model No. 931-15
For Protection of Meat and Meat Products

TRU-AIR ULTRAVIOLET PRODUCTS COMPANY, 1019 N. Madison Ave., Los Angeles 27, Calif.

Division of MITCHELL MANUFACTURING COMPANY, Chicago

ELECTRA'S HUSBAND

Ads That Make Sense

ELECTRA is nonplused. In fact she says that she can hardly believe her own eyes. For proof she has a handful of out-of-state stories about a mutual girlhood friend. But the story isn't the thing that excites Electra. A couple of ads (she is an avid reader of advertisements) have provided her with enough conversational background to keep me on the hook for a week.

"At last," she greeted me one evening recently when I came home from the office tired and out of sorts, "one of your power company advertising managers has developed a sense of humor. I've found some ads which finally make sense, because they make people read them. I've saved them so you can take them down and show them to those cronies of yours."

"So you've become an advertising expert," I said. "Those so-called cronies of mine will be happy to add you to their staff of advisors, along with a couple of vice-presidents, the company secretary and a handful of engineers who already criticize the real meat out of every piece of advertising copy they write. They have a hard enough time now without any suggestions from the likes of you."

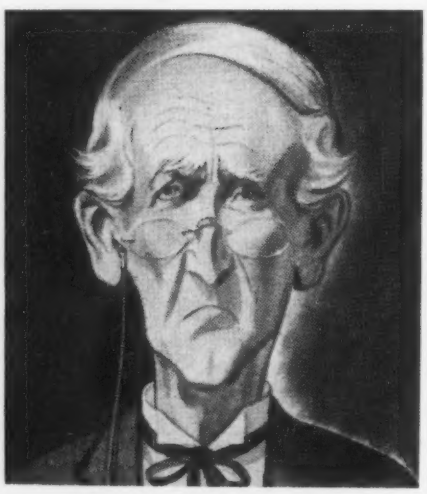
"Is that so?" she said. "Well then I don't care what you do with these ads I've found except read them. I'm just trying to give you a housewife's reaction. After all, you get a great delight out of razzing the perfume ads in every copy of *Vogue* that comes into the house."

"Every time I think of the wads of money that go into those four-color abortions," I said, "I almost turn green. No wonder Elizabeth Arden can run three horses in the Kentucky Derby."

"She could have run five horses if she had wanted to," Electra said. "The Maine Chance Farm entry originally was Lord Boswell, Knockdown, Star Pilot, Colony Boy and Perfect Bahram. Say what are you trying to do, change the subject? I want you to read those ads. You'll find the papers in your chair in the living room."

The advertisements that greeted me when I picked up the folded paper did give me something of a shock. Certainly it was unconventional in terms of the usual power company advertising copy. The illustration showed a long-haired, sharp-nosed, hollow-checked, big-eared, *pince-nezed* individual with gates-a-jar collar and a string tie who was labeled "Dr. Twitch." The text of the ad read:

"HOW TO SAVE MONEY
ON YOUR ELECTRIC BILL"
by
Phineas Q. Twitch,
Eminent Economist



Dr. Twitch

1. Disconnect your electric doorbell. What if your friends and neighbors *do* bruise their knuckles knocking? *You'll* save a penny a month. Naturally a penny saved is a penny earned. In only eleven years (at compound interest) you'll earn enough to buy another doorbell for the back door *so you can save TWICE as much by not using it!*

2. Sell your vacuum cleaner and beat your rugs by hand. The money you get for your old machine will buy several sturdy beaters and an ample supply of liniment. Then, everytime you beat ten large rugs you'll save *a whole penny.*

You can easily do ten rugs in a couple of days, after you get used to it. The exercise will build you up, even if it does break down the rugs. *And the more you beat 'em the more you save!*

3. Turn off your radio during "The Electric Hour" on Sunday afternoon. Of course you'll miss Nelson Eddy and his guest stars and Robert Armbruster's Orchestra, but you save a *sixth* of a penny every time you do it. In a year, that's *nearly* 9c. And there's no music so pleasant as those coppers clinking in your pocket.

The signature was that of a well known progressive Western power company.

Electra had come into the room while I was reading and was watching intently to gauge my reaction.

"Even you must admit that the ad is refreshingly different," she said. "It has a twist to it that will make folks read it. Imagine saving a penny a month by disconnecting the doorbell."

"It's good all right," I commented. "But the approach is a little too erudite. Sounds a bit too *New Yorker*-ish to get over with the mass of people in general."

"There you go," Electra said, "playing advertising critic yourself. What did you say to me about experts? I don't know what you've got that I haven't that makes you qualify. But go on and read the other ad."

The second advertisement carried the same headline as the first. Only in this instance there was a full length portrait of Dr. Twitch holding a Churchillian umbrella. The advice on saving money read:

1. Throw away your electric clock and buy a sundial. Of course, it won't wake you up for work, but think of the fun you'll have trying to figure out what time it is—on sunny days, anyway. And you'll save 5c every month! *At that rate you'll have the sundial almost paid for in only 41 years!*

2. Donate your electric washer to an orphanage and start doing your own wash by hand. In one month, you'll actually have saved 8c! At the end of a year, you'll have almost enough money to pay for a good strong washboard, which you'll be needing by then. The exercise will do you worlds of good, and will keep you out of mischief for hours at a time.

There was another paragraph about the savings to be made by turning off the radio during "The Electric Hour" and the ad ended with this admonition:

Watch for more of these practical money-saving suggestions by Dr. Twitch. He really knows his subject. We hope he'll help you realize how many jobs electricity does for you and how little it costs for each.

"They really are swell ads," I said to Electra as I finished reading. "Just a few years ago most power company advertising managers would have fallen over backward before they would have taken a piece of copy like that into the boss' office for his okay."

"Better late than never," Electra mused.

THE WINNER!

WANTED: 200,000 STARTS

TEST SPECIFICATIONS

CAPACITOR RATING: 130-157 MF, 110 V. A-C, 60 cycles

LINE VOLTAGE: 132 V. A-C, 60 cycles*

MOTOR TEST CYCLE: 120 2 second starts/hour

AMBIENT TEMPERATURE: 65°C

** Results in actual application of 150 volts to capacitors for about ¼ second before starting switch opens.*

DELIVERED: 1,237,660 STARTS!

. . . and Still running!

"Set your own test specifications for our Solar A-C Electrolytic Motor-Starting Capacitors", said Solar to a very, very large manufacturer of refrigerator motors. "Make them as stiff as you want and name your own test laboratory."

We sent the motor manufacturer's laboratory 8 Solar type DX capacitors, right off the production line. Eight—so there'd be no question of freak performance!

The specification test started. At *400,000* starts eyebrows raised, at the *million* mark, surprise changed to open-mouthed amazement. 1,237,660 starts were recorded for each capacitor when they let us see the test results after 14 months of continuous starting service. No wonder the motor manufacturer's engineers say, "We're convinced Solar *is* BEST for us".

In the Solar line, there's a capacitor that's best for your use, too—one that will take the toughest punishment and come out THE WINNER!

Call on Solar for your capacitor needs for Motors, Fluorescent Lamps, Electronic Heating and Industrial Control Equipment.

© 1279R

SOLAR CAPACITORS

SOLAR MANUFACTURING CORPORATION

285 MADISON AVENUE NEW YORK 17, N. Y.

A MESSAGE TO THE ELECTRICAL INDUSTRY

10 BIG ADVANTAGES OFFERED INDUSTRY IN THE "UNION PACIFIC WEST"

1. AVAILABILITY OF RAW MATERIALS
2. ADEQUATE SOURCES OF POWER
3. OPPORTUNITY FOR DECENTRALIZATION
4. NON-RESTRICTIVE LEGISLATION
5. LARGELY NATIVE-BORN LABOR AVAILABLE
6. HEALTHY LIVING CONDITIONS
7. GOOD SCHOOLS
8. GROWING CONSUMER MARKETS
9. INCREASING INDUSTRIAL DEVELOPMENT
10. FAVORABLE DISTRIBUTION FACILITIES*

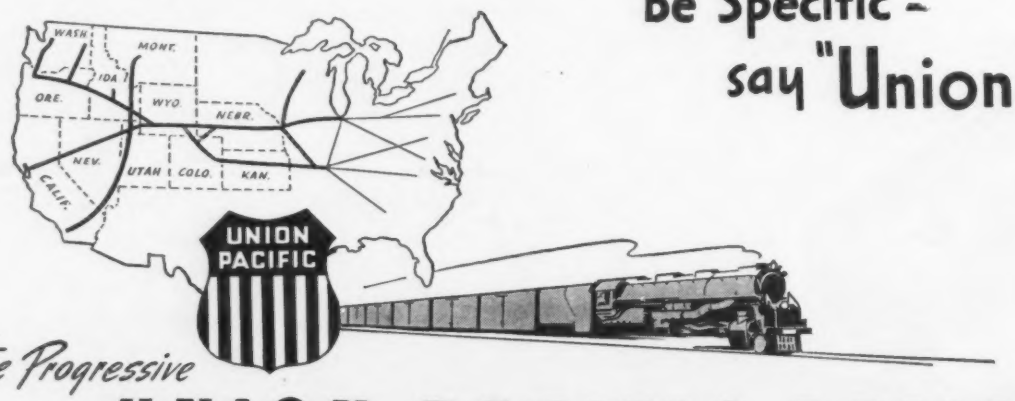
*

Union Pacific—the Strategic Middle Route—unites the East with the Mid-West, Intermountain and Pacific Coast states.

It has facilities and equipment designed to meet industry's heaviest demands. Trained traffic men offer a helpful, cooperative service to all shippers.

For information regarding western industrial sites, write W. H. HULSIZER, General Manager of Properties, Department 101, Union Pacific Railroad, Omaha 2, Nebraska.

be Specific - say "Union Pacific"



The Progressive

UNION PACIFIC RAILROAD

The Strategic Middle Route

Line Material Solderless

Electrical Connectors

Designed and Manufactured by KYLE

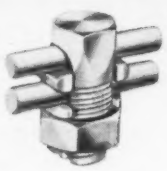
Will Take Care of Every Connection

From No. 8 Wire to 1000 MCM

Types to Meet All Connector Requirements

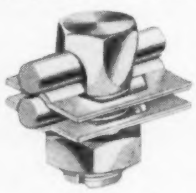
Copper to Copper

In addition to the bronze split bolt connectors shown in the large illustration, this Perma-Lok Connector is designed to give best connection between stranded wires. Lock washer between nut and lower pad guarantees permanent, vibration-proof connection.



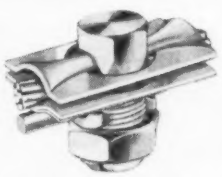
Steel to Steel (Aluminum to Aluminum)

This cadmium plated bronze split bolt connector has a plated spacer block for both solid and stranded wire connections. Cadmium plated bronze connectors are supplied in a full range from No. 8 wire to 1000 MCM.



Copper to Aluminum

Aluminum tap-off wire is placed between the two bi-metal washers on this bronze split bolt connector.



Steel or Aluminum to Copper

This cadmium plated bronze split bolt connector makes use of one flared aluminum washer and one bi-metal washer.

These are but a few of the many special types available

● These Line Material Connectors manufactured by the Kyle Corporation are developed to take care of every connection commonly found in the field.

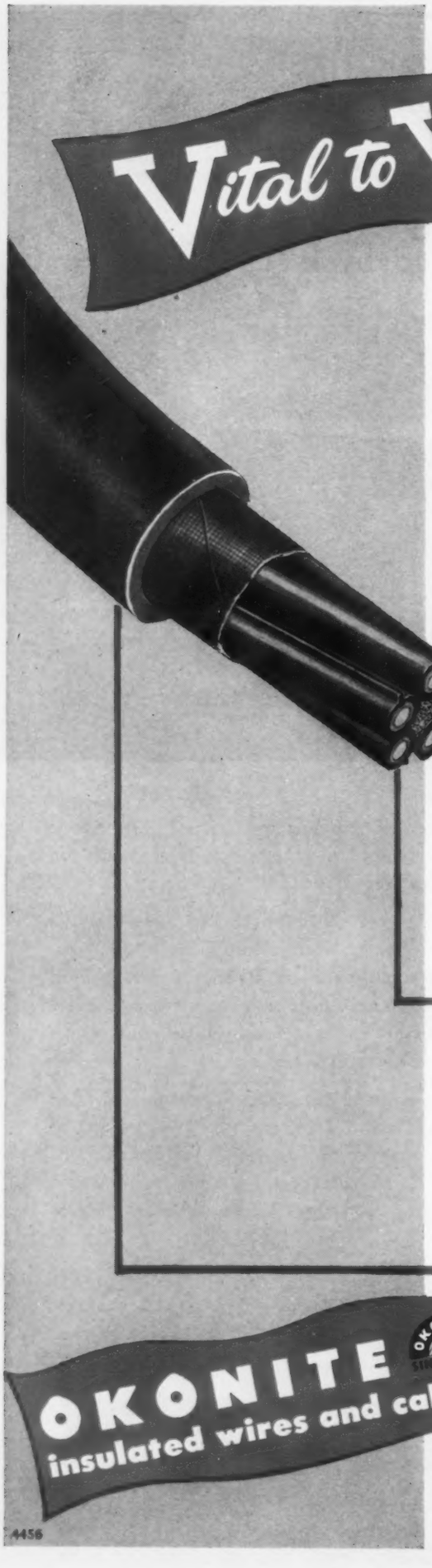
Exacting tests have proven that they stand up under all types of service and all types of weather conditions without corrosion. This comes through the use of a special analysis metal especially developed to resist distortion and stretchings. Yield point of this material is within 10% of breaking point, which is much higher than normal use requires.

There are no sharp edges to cut or nick wires. Edges of pad and nut are well rounded to fit wires closely and give utmost contact surface. Connector ends are beveled to make threading easy and safe. Carefully machined, smooth, well-rounded edges prevent nicking or chafing to cause static sparking or radio interference.

These connectors are available in the widest range of sizes... from No. 8 wire to 1000 MCM. Immediate deliveries can be made on all types and sizes. Ask your Line Material Representative.

MADE BY KYLE CORPORATION SOUTH MILWAUKEE, WISCONSIN

LINE MATERIAL COMPANY



Vital to Value today

. . . the *certainty* that it's engineered for long life from conductor to sheath

Present-day costs of installation, present-day charges for repairs put a premium on *getting the best the first time*. So, in selecting a cable, it pays more than ever today to think in terms of the highest quality . . . to look for life-extending features built into the cable. Here is what Okonite-Okoprene* offers.

1 **Okoloy-coated copper conductors** made corrosion-resistant by a continuous coating of a lead alloy developed through Okonite research nearly 20 years ago. Okoloy outlasts "tinning" 2 to 1.

2 **Long-lived Okonite insulation** made with wild up-River fine Para rubber, compounded according to the original formula, applied by Okonite's strip insulating process and vulcanized in a continuous metal mold. Its stable electrical properties have been proved in service over a period of nearly 70 years.

3 **Protective covering of Okoprene,** a neoprene compound developed a dozen years ago by Okonite research to eliminate perishable braids and to seal the insulation from air and sunlight. It not only adds electrical strength but also resists oil, chemicals and ozone. Non-flammable, heat-resistant Okoprene is bonded to the insulation and, in single conductor cables, no other covering is needed.

4 **Tough and durable Okoprene sheath** for additional protection of multi-conductor cables installed underground or in exposed locations. Non-metallic Okoprene jackets resist mechanical injury and cannot be damaged by corrosion and electrolysis.

OKONITE insulated wires and cables

Talk over your specific needs with an Okonite engineer. Discuss the best cable constructions for the services in which you're interested. The Okonite Company, Passaic, New Jersey.

*U. S. Pat No. 2,312,058

ELECTRICAL WEST

JUNE. 1946
VOL. 96 NO. 6

HUMAN ENGINEERING

HUMANITY is at the crossroads in more than one sense. Having progressed to the highest degree of civilization in the world, having developed technology to a point where life holds out manifold attractions, having conquered the air, the water and the land, and in a fair way to conquer the atom, mankind today finds itself in the position of not being able to live together, peacefully, temperately, happily and amicably. From the loftiest international level, to the simplest domestic situation, human understanding has evaporated and suspicion, bickering, strife, strikes, discord and hostility have infiltrated. Nations are alienated, a people is divided into classes with bitter hatreds, business groups are estranged, labor and management are at loggerheads, the farmer is disaffected and all of the people suffer.

Causes for this world-wide unrest are basic. Countless philosophers, sociologists, psychologists, economists, politicians, prelates and professors are searching for them and are seeking remedies. They may come forward with a solution. We hope that they do.

However, to us the search for a solution must begin at the grassroots. Fundamentally sound human relations begin in the home, extend to the neighborhood, then to the immediate community, to the local businesses and industries and finally spread out into national and international patterns. Thus the problem is local—at least initially.

LIKE any other industry, the electrical business' complexities are principally human. Technical, sales, financial and promotional problems present no major difficulties. Its troubles hinge on its ability or inability to get along with people. If it doesn't learn to deal with human relations in an enlightened manner, like many other industries, it will fall easy prey to militant groups who would take it over. Without offering any excuses, Robert W. Johnson, head of Johnson & Johnson, recently stated the case bluntly. He said: "Employers are guilty. The truth is, we stand convicted at the bar of public opinion. The verdict deals with crimes in the field of human engineering. . . . We face a rather odd equation wherein the public believes in our products but chooses to give us a vote of 'no confidence.' "

If such an indictment is warranted, it is because the conception of the field of human engineering has been far too limited. It is because the efforts to get along with people have been directed diligently at certain groups and have overlooked others. The breadth of human engineering encompasses relationships with people whose attitudes and reactions depend upon whether they may be customers, employees, voters, stockholders, members of pressure groups, people who mould public opinion or specifically politicians. In each case the relationships vary and the human characteristics change except for such fundamentals as honesty and sincerity.

THE electrical industry knows by experience that the building up of good human relationships with public and with workers may take years. It has suddenly learned that these relationships all can be destroyed in a few days or even in a few hours. It must find the equations in human engineering that will offset pressure groups which foster conflict instead of agreement, strikes in place of settlements, bad feelings instead of goodwill. It must develop equations to counteract opportunistic policies of politicians which are aimed at getting votes instead of serving the real public welfare.

As a contribution toward that end, this convention issue of ELECTRICAL WEST has taken as its theme human engineering. Various phases of this subject are treated in the pages that follow. Purpose is to emphasize again that good human relationships are not based upon something you say; they are not founded upon something you do; they are dependant upon something you are.

George C. Tenney

EDITOR

KENNETH M. RYALS, president of the Pacific Coast Electrical Association, like many servicemen today, left the Navy after the last war, an electrician, to work at his trade, save money and start his own business. By enterprise he and his partner have built Stone-Ryals Electric & Mfg. Co. into an important "small business." In this presidential address on a theme of "Human Engineering," he feels strongly that if others are to enjoy the same freedom to enterprise that he did

A DECISION MUST BE MADE NOW

THIS is indeed a Year of Decision, as President Truman has stated. But in a different sense than that in which he says it, as far as the electrical industry is concerned.

It seems to me that the basic issue to be decided is this:

Whether the sanctity of the individual and his judgment shall be surrendered to the power of government; whether the human rights of the individual shall be abandoned.

This may seem an odd subject for the president of an electrical association to discuss in the annual message. Yet it looms as the decision of all-out importance in a year like this. It is so vital that beside it all other subjects are trivial. Until the decision is made, there can be no future for the industry as we have known it.

This issue is so momentous that even the serious consideration of it is frightening. First of all, of course, is this: On what basis will this issue be determined? Who will make the conclusions? Is this to be you and I and all of us, or is it to be John L. Lewis, Walter Reuther, or Caesar Petrillo?

With a heritage and background such as ours, it is a pathetic farce to see our elected representatives of government so willing and eager to trade this, their precious American heritage, cheaply. They are the people on whom we are dependent to guide us through a state of confusion following this terrible war. If they surrender to such subversive forces as the PAC, whose avowed design is to alter the economic and social system of this country, they fail completely in their duty as statesmen. For the social and economic system of this country was secured at great cost of life and suffering by our forefathers to insure that the individual would have freedom, first and foremost.

In the last decade, we have seen these rights and privileges superseded by a philosophy that the so-called common man is incapable of self determination and expression. Therefore, he must be guided and cared for like cattle, by individuals or groups who obtain their positions of power by false promises. Once in, they attempt to perpetuate their offices by intimidation or the lavish expenditures of funds secured from their constituents through taxes, dues, or other means.

The resources and the strength of this once strongest nation on earth have been wasted, drained down the sewers of politics. If we do not soon stop this extravagance we will be reduced to the same state of general poverty and weakness that the rest of the world is in now. It does not take an economist to see that.

Many months before the war was over, we saw men of industry working night and day to make plans and to prepare for the time when the terrible ordeal would end. Anticipating the return of our service men and women to establish the peace they had so dearly won, these men of industry secured from their industries throughout the country promises of backlogs and work piles that run into billions of dollars. With these, our service people who had done a grand job would be re-absorbed, and the men and women who had done so well building war materials would revert from wartime to peacetime industry.

All the pent-up demands for the millions of discontinued articles would generate the need for respectable and worthy jobs. All in all, this would produce higher standards of living and maintain our position as the greatest producing nation on earth. It would benefit all mankind and permit us immediately to commence paying off the greatest debt ever accumulated by any nation.

This was a self-respecting ambition, and an honest one. The nation must pay off this debt by one means or another, and this method would have been the most logical one.

It is almost a year since V-J Day and our state of chaos becomes more pronounced. Our reconversion plans have been sacrificed on the altar of politics. We have had three major strikes—automobile, steel and coal—besides thousands of smaller ones. These have practically paralyzed reconversion. All of this could have been avoided by leaders who had had the ability and the courage to handle the situation truthfully. A leadership that established responsibility, irrespective of political patronage, and looked to the best interests of the country and the welfare of the people, could have prevented this chaos.

The state of confusion and uncertainty has become so great, due to the blundering stupidity of little people in big jobs, that unless some basis of procedure is developed, we will continue to have confusion. We need to reaffirm that we may again depend in the future as we have in the past on our once American system of free enterprise. This alone will establish a confidence in everyone's mind.

A great deal has been said about incentive. In the final analysis, this is the creator of all progress. There *must* be an incentive. When there is, there follows a reward, diversified in many ways, but the most prominent feature of which is some profit to self and a promise of betterment to those of one's family.

Take away incentive and the right of individual attainment, and you remove the joy of life. Instead of men, we will have cattle.

Under our American constitution, it is the inalienable right of the individual to seek attainment in propor-

tion to his own honest ability, effort, intelligence and education. This motive power is the foundation of the success of our country.

Without question, every means should be provided by the State for the care and comfort of the incapacitated, the mentally deficient, and those who are completely incapable of self-support. But no self respecting person wants to be kept in that category if he can support himself. All he asks is the freedom to work or do business to the best of his ability. By proper regulation, which would protect the rights of the individual against the unscrupulous, history has proved that our democratic government under our American constitution, is the best on earth. Our every effort should be made toward the return of such government under constitutional law.

Ours is a young industry and it would seem entirely appropriate that for our own self-preservation and for the preservation of what we are pleased to call free enterprise, we could well afford to devote as much effort and resources as possible to preserve this traditional heritage.

In this industry we have had outstanding leaders in engineering, in construction, in developing customer ownership, in selling both the services and the products of the industry. Now our greatest need is for the same high type of leadership in our human relationships. We need leaders now who can guide us back toward these fundamental ideals of freedom and self reliance. We need strong men from among us to give to this cause just as earnestly and energetically in time and effort as those who are leading the campaign to communize America are giving. We need men who will give unselfishly and without personal ambition to preserve these freedoms under which we have grown a great nation.

The words of a song say it for me—

"Give me some men
Who are stout-hearted men,
And I'll soon give you
Ten thousand more—"

We who have grown up and built our business under such opportunities and freedom naturally wish that our children and grandchildren and those following us may enjoy these privileges too. They are enjoyed practically nowhere else on earth. All kinds of governmental systems exist and have existed in which the individual is subservient to the State. None of these have produced the progress nor the growth that our atmosphere of freedom has produced. Why should we trade backward to one of those outmoded systems, when before our eyes are evidences of failures of such systems to provide what freedom has provided?

This is the decision before us—a free economy or one of slavery.

Human relations in an industry as large and complex as the electrical business require that there be unity of purpose, unity of action and a thorough understanding of the relationships of each branch with the other. An over-all industry organization is essential to accomplish this purpose says J. PATRICK JOHNSON, president, Northwest Electric Light & Power Association (Puget Sound Power & Light Co., Seattle), in his annual presidential address to the members, because

IN UNITY THERE IS STRENGTH

A YEAR ago Germany had fallen and Japan's defeat was anticipated before the end of 1945. That has now been accomplished, and we in the electrical industry can be proud of our part in the war.

The electrical manufacturers turned out equipment for war purposes that only the electrical manufacturers could have conceived, designed and manufactured in mass lots. The men from the distributors who used to talk to us about ranges, water heaters, refrigerators and other appliances and equipment, went off to talk to other people about marine supplies. Contractors worked day and night in handling the emergency — army camps, housing projects, new and expanded industries. They were plenty busy. The electrical dealers put in every sort of merchandise to keep their doors open—but they were also taking care of their customers. As long as they could hang on to appliance servicemen they were seeing that the customers' appliances worked. Everybody was busy doing his bit. The manufacturers were turning out what would help win the war, the distributors were expediting what would help end the war, the dealers were helping the homemaker make her electrical appliances stand up until after the war and the contractors and utilities were trying to get the power to them. No wonder that J. A. Krug said, "power has never been too little nor too late."

During this period, our association had been revamping its organization setup, so that at the close of the war we would have an all-industry electric association to work together in solving mutual problems. Although the Northwest Electric Light and Power Assn. was organized in 1908, membership was confined to electrical utilities, manufacturers and distributors, and their employees up to 1943. Two and one-half years ago, membership was opened to electrical contractors and dealers and their employees. Since then we have encouraged contractors and dealers to join our association by means of regional meetings throughout Washington, Oregon and some of Idaho. Whereas in the past most of the manufacturer and distributor members were those from whom the utilities purchased equipment, we are now striving to secure representation from all electrical manufacturers and distributors.

In broadening the scope of our association, we are not trying to usurp the position of associations of electrical manufacturers, distributors, contractors or dealers. Each such organization has its place. On the other hand, there should be a place where the utility and dealer can frankly discuss merchandising; where the contractor and utility can discuss equipment installation and construction work; where the distributor, dealer, and utility can discuss employee discounts on appliances; where the manufacturer, distributor and dealer can discuss the need of servicing the manufacturers' appliances. We offer our association as a common meeting ground for the thrashing out of these problems.

For the first time, all five branches of the electrical industry participated in the conference programs held this year by the various sections of our association.

The Business Development Section held a small meeting last fall, at which time, plans were laid for the first postwar expanded conference to be held this spring. This three-day meeting was held in April, with all groups taking part in the discussions. The final day was turned over to the manufacturer, distributor, contractor, dealer and home building representatives, with the utility representatives sitting on the side lines listening. It proved one of the finest programs ever held by our organization.

Last year our association undertook the promotion of industrial development in the communities served by our electric utilities. Industrial development departments were established in most of the companies, and some of the utilities joined together in a national advertising program to encourage industries to move to the state of Washington. Similar advertising was continued this year. Our association has now obtained the exclusive use in the Pacific Northwest of Research Advisory Service for providing technical, economic and marketing assistance to customers served by the Northwest utilities. This service was established by Bert H. White, vice-president of the Liberty Bank of Buffalo, in 1937, and was used by a chain of banking organizations in the East. During the war the government took it over for the Smaller War Plants Corp. A full-time director of this service has been set up in the Northwest to handle this work.

For the first time since before the war, a fall meeting was held by the Engineering and Operation Section. The attendance was confined to a small group, who laid plans for an enlarged spring meeting. The latter was held in April with a big attendance. Much good came from the discussions on "getting the job done," despite shortage of, and delay in obtaining equipment, materials and manpower. Special interest was shown in deferred maintenance resulting from war restrictions, substitutes for cedar poles, war-developed equipment, rural telephone service by carrier current and short-wave radio communication with conveyances. In addition to having the manufacturers and distributors participate in the discussions as usual, particular interest was centered on the contractors' place in the program.

The Personnel Section held a fall meeting which covered such subjects as sick leave and medical aid, physical requirements, insurance and pensions, accident prevention, personnel forms and returning veterans. Another meeting is scheduled for June, when emphasis will be placed on accident prevention, with discussions on safety education, safety equipment, accident analysis, visual education and off-the-job accidents. Other important items will be maintenance of employee morale, returning servicemen, merit promotions; and the development of efficient personnel departments.

The Accounting and Business Practice Section held its annual meeting in May. The program covered the wide range of accounting and procedure from the meter reading to the annual balance sheet. Specific subjects were customers' accounting and collecting, internal audit, classification of accounts, plant and depreciation accounting, pay roll procedure and personnel, and general accounting.

Last year, work was started on a booklet telling the story of rural and farm electrification in the Pacific-Intermountain Northwest. This publication, which was released in February, showed the record of accomplishment of the private electric companies over a period of 35 years in the field of rural electrification and pointed out the aims of their comprehensive postwar rural electrification program. It also made obvious the fact that, because of these accomplishments, it is neither necessary nor desirable for any tax-supported agency to enter the field of rural power distribution. The booklet demonstrated that the private electric companies have always cooperated to the fullest extent with the agricultural colleges, U. S. Bureau of Reclamation and other agencies or groups in developing the agricultural resources of the Pacific Northwest. Wide distribution was made of this story of what the business-managed utilities have done, and expect to do to help the farmer. Reaction to the booklet has been excellent.

Another subject being studied in the Northwest is electric house heating. Committees have been set up in the association with representation from the various utilities to obtain all information possible on present house-heating installations, to the end that inquiries made by customers may be answered. Uniform survey data sheets are being used by all utility members of our association in order to make comparisons easier. Some of the utilities are obtaining detailed information on some of the installations in order to study the effect on generation, purchase of power, and on transmission and distribution systems. Due to the lack of metering and other equipment, a proper study of this experimental application of electricity has been delayed. As rapidly as proper metering equipment is obtained, it is being installed on the various types of electric home heating equipment in operation.

Valley authorities still remain the biggest threat to the private electric industry in the Northwest, the current headache being the result of a hangover from last year in the form of threats of Missouri Valley and Columbia Valley authorities. Hearing on the proposed MVA has indicated that it will receive no quarter in Congress, and work has since started in the Missouri Basin on the Pick-Sloan plan, with an Inter-Agency Committee coordinating the work.

Identical bills for the establishment of a Columbia Valley Authority are now before the United States Senate Commerce Committee and the House of Representatives Rivers and Harbors Committee. This measure is more sweeping and far-reaching in its planned economy aspects than the TVA. A hopeful sign in relation to this problem was the recent establishment of an Inter-Agency Coordinating Committee which held its first meeting in Portland, Ore., on Wednesday, May 8, 1946, with Colonel T. D. Weaver of the United States Army Engineers as chairman.

The more this legislation is understood, the more opposition there is to it. It is therefore an obligation on the part of the association to see that the public in the area in which the association operates is adequately informed.

During the past year some progress has been made in knitting together the various branches of our industry—that is, those that are tax-paying and business managed. At the conferences, it has been very evident that all five branches believe in the American way of doing business. In the interest of the public, the customer, the employee and the investor, free enterprise must be fostered and preserved in the electric field. This can be accomplished only by a united front of the entire industry.

Looking into the future, our goal can well be "One for All and All for One."

Among the major current human relations problems is the adjustment and reorientation of the G.I. who returns to his prewar job. Involved are certain mutual rights and a number of mutual obligations. One of the many thousands of returning veterans here indulges in some self-analysis in behalf of all G.I.'s and offers some timely suggestions to employers. He prefers to remain anonymous because by so doing he will be able to speak more frankly and critically on the subject

A RETURNING G.I. LOOKS AT HIS JOB

LET'S approach this subject from the standpoint of a G.I. who has returned to the company which employed him before the war. As a matter of fact that is the writer's predicament, so he is committed to such an approach.

Let us first examine a couple of obligations which returning G.I.'s owe to their employers. This side of the question is often overlooked. Self-analysis (and particularly self-criticism) has never been a popular indoor sport.

It is generally recognized that, under the Selective Service Act, a company is obligated (within certain limitations) to re-employ a veteran. That was one of the guarantees made to the G.I. to give him some measure of security when he returned. Notwithstanding this guarantee, the wise returning G.I. will surely recognize that no bargain is a good bargain unless it has lasting benefits to all parties involved. In other words, it should be apparent that unless a returning employee can ultimately be at least as good an employee as he was when he left for the service (in general he will be better), and as good an employee as others who are available to the employer, the bargain will not be a good one and will ultimately end unhappily — for one, and probably both parties.

Assuming that the average G.I. who returns to his prewar employer is serious about returning to his job and getting on with the career which was interrupted when he left for the service (and observations indicate that this is generally the case), it would appear that his lasting interests would be best served by "getting back into the groove" with a minimum of delay and difficulty to all concerned. Obviously, his doing just that is of real interest and value to the employer as well.

Means whereby the employer can assist in "reconverting" the G.I. will be discussed later in this article, but it is important to note here that the G.I. has a bigger stake in *his own* civilian readjustment than has his employer. He should, therefore, bend every effort toward that end.

This is not intended to minimize the important part which an employer should play in the reabsorption of his returning G.I. employees. It is almost axiomatic today that if an employer is not successful in handling his employees—whether returning G.I.'s or others—he will not be successful with his business over the long pull. It simply is one of the predominantly important phases of modern business.

However, let us return to another of the factors which the returning G.I. can, and should, contribute to his own success in returning to his peacetime job. This relates to the pay angle. Most G.I.'s probably will have no downward pay readjustment to make when they return from the service to their companies. They made that readjustment when they took the trip the other way —from their companies to the service. On the other hand, some employees made the transition from civilian to service life and actually improved their income in so doing. This was true in the case of some officers. It was also true in the case of some personnel on flight status, as they were paid 50% over the regular base pay allowed others of the same rank. In nearly every case personnel earned every dollar of any increase which they may have been paid in the service. Their work may have been highly specialized. In a great number of cases it was dangerous—sometimes highly dangerous even for war.

Assuming that danger is one of the things to be expected and accepted in time of war, there is another factor that should not be overlooked in considering the pay increases which some personnel earned in their transition from their civilian occupations to war duty. That factor is the unprecedented rate at which all of the armed services expanded during the war. Expansion in the armed services created a need for more leaders just as it did in industrial organizations. This causes men—and quite often young men—to rise rapidly. During the war, this occurred in the armed services and in industry —often at an amazing rate. However, the war is now over (at least the fighting and expanding part is) and not only the armed services, but the industrial war machine, have been engaged in a tremendous contraction—the rate of which probably has exceeded even the original rate of expansion. Some G.I.'s are therefore returning to their old jobs (or to other jobs in the same companies) at rates of pay which may be less than those they were earning in the services. Assuming that their employers are paying these veterans the "going rate" and what they are fairly worth for the services that they are performing, it seems to the writer that that is about all the veteran can reasonably expect of his employer until conditions permit (and the veteran is qualified for) promotion to a job of higher skill or greater responsibility.

It should be remembered that many industries have also pared down many of the executive posts which were needed to keep the war machine in high gear during the war. So, also, are the armed services greatly reducing the number and ranks of their officers. The returning veteran can probably console himself, upon assuming reduced financial status, with the thought that had he remained in one of the peacetime armed services he might also have had to accept a reduced rank and financial status. In any event, the veteran who decides not to remain in the permanent armed

service but to return to his civilian pursuits, will do well to get adjusted to all implications of civilian life—including pay readjustments, if any—as soon as possible. The writer is naive enough to believe that there are still opportunities for good men to rise if they conduct themselves properly and "know their stuff." Of course, even men who do "know their stuff" have been retarded by a failure to adjust themselves to their environments. And, by the way, that applies in the armed services as well as in industry!

What an Employer Can Do

As was mentioned earlier, there are some things which an employer can also do to ease a G.I. back into his old place in the business. It is very much to the employer's advantage to do this as smoothly and as soon as possible. If he doesn't, he may have an unhappy and therefore inefficient employee on his hands. And, in this case, it may be an employee who may be difficult to handle due to his rights to remain on the job for a certain period after his return. In any event, few if any employers in their right minds want employees who are dissatisfied or who are not adjusted to their jobs.

One obvious thing that an employer can do to help the returning G.I. get quickly re-established in his environment is to receive him *cordially*. By that it is not meant to merely give him a slap on the back, tell him that you are glad to have him return to the fold, and put him to work. It means that the returning G.I. will respond to *continuing* understanding and kind treatment, just as employers themselves do (at least most of them).

One of the means by which the maximum value of returning G.I.'s can be utilized quickly, is to try to take advantage of all the possible additional skills which they acquired during the war. One of the differences between World War II and all previous wars is the vast increase in mechanization and technology which developed and the corresponding range and complexity of the skills required to service them. The armed services utilized almost every type of skill required in industry—and a number of skills that industry did not require. Moreover, the armed services gave excellent training courses in these skills with facilities, equipment, and instructors on a scale that few private industries could hope to duplicate. Cost was no object—results in producing urgently needed trained technicians was what counted. Many men were taken from industry and retrained in fields in which the armed services were deficient at the time. Sometimes this retraining took men into much higher skills than they had previously utilized in private industry. It cost the taxpayers a lot of money. Surely if an employer can get an old employee back already trained in a higher skill than he possessed when he went away, he should bend every effort to utilize the higher skill.

Some will say that skills produced by service training are not adaptable to their businesses. In the services there was a fairly universal joke to the effect that "there is the right way, the wrong way, and *our* way." That was an effective way to dispell any preconceived notions about the relative merits of different methods of doing the same thing. It may have been necessary in a concentrated system of training designed to produce the maximum results in the shortest possible time. However, rigid adherence to "*our*" way was probably no more out of place in the armed services during the war than it is in private industry today. The point to be made is that good training in any field should be of value in that field—even if it is necessary to do a certain amount of conversion to "our" way.

Therefore, it is recommended that employers learn what additional skills their returning G.I. employees acquired during their absence. These should be recorded, carefully analysed, and made a part of the G.I.'s personal record. If the additional skills can be utilized at once, so much the better for both employer and employee. However, if these other skills cannot be utilized at once, the record should be maintained for their possible future use. The first step, however, is to learn what these skills are.

This leads to the next point of mutual interest between the returning G.I. employee and his employer the importance of giving the returning G.I. some form of indoctrination. Only it probably should not be called *indoctrination*. That is a word that most G.I.'s got to know all too well when they first entered the service. There, the indoctrination into service life was arduous and long—at least it seemed long. Actually, it usually required several months. During this period, the new recruit was given a thorough period of physical examinations, innoculation shots, aptitude tests, physical training, military drill, training in combat methods or the specialized field that the G.I. was to be assigned, and every other kind of training which could be imagined to bring the G.I. Joes (and Janes, too, for whom the training was just as specialized—if not as rigorous) to the maximum peak of efficiency in the shortest possible time.

Now, the writer does not suggest nor believe that as much training is necessary to bring the average G.I. back into the ways of civilian life as was required to make him a G.I. For one thing, when he returns to his employer, he has still been a G.I. for only a minor portion of the time that he was once a civilian. Moreover, for most of the time that he was a G.I., he dreamed of being a civilian again.

The amount of indoctrination to be given will depend upon a number of factors, including the type of returning G.I., and the type, size, and complexity of the company. At the very least, there should be a regular program developed for meeting and greeting the returned veteran and then talking things over with him in an easy, friendly manner. He should be given a chance to explain what portion of his G.I. experience he feels might be of use to his employer, what he would like to do or work toward doing (if different from the job he had when he went away), and any other of his general aims and objectives that he feels like discussing.

Company Indoctrination

Having given the veteran a chance to do a little talking, the employer should be entitled to a little talking of his own. It would seem appropriate to explain to the returning G.I. some of the things that the company did during the war to help win the war—in other words, the mutuality of interests which continued between the G.I. and his company even while he was away. Then the employer could explain some of the problems facing the company. This could be done in a manner, first, to show the G.I. what he can do to help in the general solution of the problems and, second, to indicate to him the importance of their solution. (Incidentally, this is an area in which much remains to be done, both with returning employees and with employees *who have never been away*.)

After the returning G.I. has been given some form of preliminary indoctrination into the general phases of his company, it may or may not be necessary to give him some more specific training in the particular job to which he is to be returned. Again, this may depend upon several factors, including what he has been doing while he has been away and how closely this follows the job to which he is returning.

It may be that the G.I. is returning to a job in which he is scheduled for further advancement as he gains greater skill or experience. In this case, he may qualify for "on the job training." This type of training is based upon the same principle as the more formal educational program offered G.I.'s at the various universities and

colleges throughout the country. About the only difference is that instead of going to classes each day, the G.I. works on his job and fills in supplemental training according to the other requirements of his job. Both the collegiate and the on the job training are covered by the same federal legislation—the so-called G.I. Bill (Public Law 346). This legislation is based upon the premise that three, four, or five years is a long time to take out of a man's life, particularly during the time that he is "on the way up."

The bill was enacted with the view of partially compensating a veteran for this lost time. With respect to on the job training, it provides apprenticeship allowances up to $65 per month if the employee is single or $90 per month if the employee is married. These are *maximum* amounts under the present legislation and are subject to reduction to an amount equal to the difference between the pay of the G.I. as an apprentice and the rate of pay when the training is completed. As the pay of the G.I. progresses toward the maximum rate for his job, the amount of government allowance which he receives under the G.I. Bill is reduced by a corresponding amount.

These allowances for on the job training may be continued for a maximum of the same length of time as those for collegiate training, namely, 48 months. This is modified in the case of on the job training to provide that if the apprentice reaches the full rate of pay for his job before the end of 48 months, the allowances stop at that time. In any event, whether or not the employee reaches full pay for his job by the end of the 48-month period, the government allowances stop. However, this is the same thing that will happen if a G.I. going to college fails to complete his educational course after 48 months of instruction — his government allowances under the G.I. Bill will stop.

Many progressive employers have already taken steps to make on the job training and the accompanying allowances available to their employees. It is strongly recommended that employers who have not yet taken these steps do so as soon as possible, in order that the accompanying benefits to themselves and their employees will become available without delay. Of course, the development of such a training program may be somewhat of a problem in some companies. Other companies already have training programs which may be available or adaptable to on the job training and thus qualify their G.I. employees for the government allowances. The public school system, through the State Department of Education, is also understood to be in a position to assist with such programs. Whatever the problems are, they are in general no more complex than any other employee problems and well deserve the time and attention which may be required to develop a suitable program. First, it will be of immediate benefit to the returned G.I. by helping to raise his income, without penalizing his employer. Second, it will assist in carrying out the program established by the Congress to assist the returning G.I. Third, the availability of on the job training allowances from the government will assist employers in recruiting potentially better new employees from the ranks of returning G.I.'s than the present experience and training of some of them might justify. Conversely, the employer who does not have on the job training to offer in recruiting new employees from among G.I.'s places an immediate handicap upon his own efforts.

It is hoped that it will not be necessary to caution against the attempted use of on the job allowances from the government by an employer as a means of paying *substandard* apprentice rates to G.I. employees, with the expectation of having the government make up the difference to the *normal* apprentice rate. In the first place, this sort of practice will soon become known and the government will stop paying the allowances. In the second place, such a practice will produce the sort of poor employee relations that are merited under the circumstances.

Officers vs. Enlisted Men

Turning now to quite another phase of the G.I. subject, it seems necessary to say something about the relative merits of employees who served as officers during the war and those who served as enlisted men. In a way, the writer rather regrets that it should seem necessary to bring up this subject. There has already been a lot of discussion in Congress, in the press, and elsewhere regarding the relative treatment of those who served as officers and those who served as enlisted men. Elbert Hubbard is said to have once been walking down the street with a friend when they passed a drunk, concerning whom Hubbard's friend made some slighting remark; Hubbard turned to his friend and said, "But for the grace of God, there go I."

It must be remembered that in arming the nation under the Selective Service Act enormous drafts of men had to be procured in the shortest possible time. Obviously, most of these men were to be enlisted men. Not everyone could be a general or an admiral—any more than in business everyone can be a president or a vice-president. Anyhow, in the rapid expansion of the armed forces a large number of enlisted men were needed and a much fewer number of officers. It so happened that during this rapid expansion some men were taken in as enlisted men who were just as good material as those who were taken in as officers. Conversely, some of the men taken in as officers later turned out to be poor selections. Well, that sometimes happens in business firms, too. The point to be made is that not all the talent was restricted to those who were officers.

This should be borne in mind when evaluating, for reassignment to the organization, a man who is a returned veteran, as well as when evaluating a man for employment as a new employee. In this connection, do not overlook the enlisted men—the corporals, sergeants and petty officers—who became non-commissioned officers. These were still enlisted men who, for the most part, rose from the grade of buck private or apprentice seaman and became non-commissioned officers. It was just as hard, and in some cases harder, to gain a promotion from buck private to sergeant as it was to go from second-lieutenant to major. Just to clear up any question about the writer's sincerity in stating the case of the enlisted men, it should be said that he happened to be an officer during the war. However, he knew others whom he considered qualified to be officers—but they were enlisted men.

No discussion regarding the returning G.I. should overlook some brief mention concerning the returning G.I. Janes. The observation of the writer was that, by and large, these girls did a marvelous job. Sometimes things did not turn out well for some of them, but things did not always turn out well for some of the Joes, either. However, in most cases the Janes underwent a much greater transition than the Joes in getting geared to the armed forces and they deserve much credit for it. As the Janes return to their jobs, they are entitled to every bit as much consideration as the Joes.

Finally, the writer wishes to say something on behalf of the partially disabled veteran who may return to his company or who may seek employment as a new employee. There will be more and more of these boys in evidence as time goes on. Many of them are still in hospitals recovering from their wounds and being fitted with prosthetic devices and learning their use. Most of these men can and will take normal places in industry and business if given a fair chance. It seems to the writer that industry and business has a moral obligation to see that they do get a fair chance to make their own living. That is what most of them

want to do. If they don't get an opportunity to do this, it will only be necessary to absorb them as wards of taxation—to the detriment not only of the veterans themselves but of industry and business as taxpayers. Industry and business should bear in mind that these wounded veterans got that way while defending the American way of life—in which industry and business have a very large stake.

Shortly after Winston Churchill had been deposed as Prime Minister of Great Britain, he is said to have been ruminating over his downfall and to have quoted this poem:

"God and the soldier we all adore,
In time of danger—not before,
The danger passed and all things righted,
God is forgotten — the soldier slighted."

Let industry and business be sure that, in the transition from war to peace, the G.I. Joes and Janes are not forgotten or slighted. They will ultimately become a very important part of the communities in which they live and of the nation as a whole. They need business and industry to help them become re-established in civilian life. Moreover, business and industry need them on their side.

Engineers can do these things right now; and they need to be done. They will pay off to the engineer who practices them, they will improve the standing of the engineering profession and they will contribute to the welfare of people everywhere. They pertain, not to building better machines, but to building better relations with people. WAYNE SNOWDEN, Electrical West engineering editor, interviews DR. BALDWIN M. WOODS, U. of California; they find that

WHAT ENGINEERS DON'T KNOW CAN HURT

DR. BALDWIN M. WOODS, professor of mechanical engineering who heads the University of California Extension Division, had written as follows for the *Journal of Engineering Education:*

"I suppose that most scientists of today would agree that there is no problem more important than the manner in which nuclear energy is to be utilized. Those with whom I have discussed the subject are agreed that this is more important as a problem than that of immediate further development of knowledge of the phenomena themselves."

At this point I wrote down a question: "Don't you think the latter might apply to most other scientific problems as well?"

Dr. Woods' article had continued: "Can the engineer expect to act as expert in this applied field? Can he assume himself to be an expert in economics, government, education and business? As I see it, the point at which he must become educated is that of his role in these affairs, relative to the role of those who are themselves experts in the fields mentioned. Isn't it alarming to have engineers voice very strong beliefs in economics or business or education or government, when one discovers on further study that they have never paid the price of becoming experts? Isn't it a little presumptuous for us as engineers to ask the full respect for our profession if we are unwilling to give the same respect to those in others?"

As I read through these questions each of them caused me to raise three or four more of my own. Mine boiled down to the short one: "So What?"

This was not a flippant question. Dr. Woods had touched at the roots of the human-relations problem which confronts engineers today. But suppose the greatest single danger lying ahead of engineers is that of being engulfed, along with everyone else, by atomic destruction. Suppose engineers are, generally, inexpert in social fields. Suppose they are prone to assume that a general application of engineering *method* is all that's needed to make everything just fine. And suppose the assumption is wrong. How does knowing all this help? What can any given engineer do about it tonight or tomorrow morning?

That is what I meant by the questions which added up to "so what?"

Knowing Dr. Woods to be a man who does not stop after thinking things half way through, I went to him with those questions, and out of our meeting came some practical suggestions for the individual, working engineer.

We started out with that first question, as to whether it's not far more important, right now, to make good use of what scientific knowledge we have than to strive for more scientific knowledge. Dr. Woods' answer to this was as close to an unqualified "yes" as a scientist will give on any subject.

That alone is enough to give pause to any engineer. For whether the engineer is working in the field of "pure science" or in his more usual field of applying science to general use, he is rarely considered responsible for what the far-reaching social effects of his work may be. That is to say, he does his work, which may be getting a mountain stream to toast toast and pop it up golden brown, and meanwhile his community social service, American business and the United Nations jog along as best they can. But if they are all jogging along toward a big black pit, carrying the engineer along with them, it doesn't make much difference whether the toast pops up golden brown or charred to an elemental lump of carbon.

Things appear to have reached the point where the engineer, simply as an inhabitant of the earth, had better do something for his own self-preservation, or else. Of course this call to action goes forth to everyone, regardless of what his vocation may be. And that brings us to consider how engi-

neers stand in special relation to the troubles of the world, and exactly what engineers may do to contribute most effectively.

As suggested in his quoted article, Dr. Woods notes that engineers too frequently feel that being an expert in one field makes them an expert in every field. This is not the exclusive property of engineers. The tendency to consider oneself an expert on all subjects can be noted among doctors, lawyers, professors, business men, labor leaders —in fact in any expert field that one may choose.

The lesson for engineers is this: Mere ability to think straight will not supplant a lack of knowledge.

Failure to realize this basic principle can be seen in several statements by scientists in connection with setting up a program for atomic energy. They realized, as many did not, the enormous potentialities of atomic energy, for good and for bad. They realized the necessity for action. What they failed to realize was the complexity of political and international pressures within which the program would have to be worked out, requiring the touch of experts in those fields to obtain a given result. Hence many of their suggestions were unworkable, and their solid ideas were, as a result, listened to with less respect.

Recognition of the principle that one's thinking must be armed with facts may serve the engineer as both an incentive and a guide for expanding his knowledge into other fields.

The purpose of such self-education by engineers — continuing throughout life—would not be that of enabling them to shine on the radio program "Information Please." The purpose of an engineer's giving himself the broadest possible education is to enable him to see the limits of his own expertness and to understand other fields at least well enough to recognize where the need for other kinds of expertness begins.

As an engineer makes progress along these perimeters of his knowledge he begins to wipe out blind spots. Each time he does so he eliminates one spot where he might have blundered through ignorance. He begins to enlarge the field in which he can think straight. He increases his understanding of, and hence his influence upon, experts in other fields.

Economics, sociology, education and government are fields in which the engineer can profitably expand his knowledge. For whatever course of action finally determines our destiny will probably be laid out by experts in these fields. Experts in these fields are not special individuals labeled "expert." Among experts in government, for example, we might find a few writers, editors and professors; we should certainly find some senators, diplomats, ward politicians and bureaucrats.

The point is that within the respective fields are endless practical problems, the handling of which develops experts of various sorts. If the engineer expects to influence those individuals, he must have some understanding of what their working problems are.

This can be quickly grasped if we think of it the other way round. We know how we would feel if someone with little understanding of engineering method should presume to tell us how to go about our job. We wouldn't like it. Whether we liked it or not might not in itself make much difference. But not liking it would tend to set us against anything the individual might have to offer. And it might be that after he'd got through telling us how to do our engineering, about which he knew nothing, he'd have a real idea to offer about which he was well informed.

Better understanding of other fields and of the relations between fields, a broader view of his own field, a wider sweep of interests, and an enlarged capacity for getting along better with all kinds of people—all these things follow in the path of directed study.

As the engineer grows in these directions, respect for what he has to say will grow. That he should gain this respect is vital. There are too few people who can think straight, and the necessity for hearing from them is urgent. If, as time goes on, the engineers have not been heard from, it will not be because they couldn't think straight. It will be because they haven't learned where their thought is needed most, or because they haven't learned that if straight thinking is wrapped around a core of ignorance it isn't straight thinking any more.

Thoughtful engineers, as well as societies, clubs and associations have for some time been thinking along these lines. It is not by accident that subjects outside the purely technical field have been appearing with increasing frequency on the programs of engineering groups. Group activities which look beyond the borders of pure engineering and reconnoiter the ground outside pay off in several ways. They help to orient individual engineers, not only by informing, but also by suggesting ways in which individuals can direct their own study along fruitful and efficient lines. To the degree that such activities succeed, they are improving the stature of the profession as a whole. And they are moving it in the direction where the engineer's voice, noted for basic qualities of reasonableness, may be sounded with assurance in the conferences of the world.

Young engineers, who should be pioneering in activities of this sort, too frequently are indifferent to a group program which is not advertised as offering them the latest know how in their own small fields. They stay away in droves. This is shortsightedness of the gravest sort, jeopardizing not only their own careers but also the standing of the profession with which they will be identified through years to come.

The difficulty may be transient. for engineering colleges are already reacting to the need. Tomorrow's graduate may be more alert to the full breadth of his responsibility. In the meantime, here is another direction in which every engineer may do something concrete right away.

Individual study, group activities. Essential, but without much relation to the everyday job, and without much prospect of immediate results. A good long-term program. But how about right now? I asked Dr. Woods:

"Let us visualize an engineer, young or old, holding a position in an established enterprise, such as an electric power service, or a manufacturing concern—a position wherein his duties are strictly those of engineering. Let us say that this position does not specifically require him to deal effectively with people or to concern himself with policy matters of the organization for which he works. He is just practicing engineering. What, then, are his opportunities for contributing, in his work, to better human relations, to the good of the organization, and to his own well-being, all at the same time?"

Dr. Woods' answer to that one was immediate, practical and concise. First, he said, the engineer can study his organization's policies, particularly those relating to personnel; learn to understand the reasons for them. Next, he can help apply them in his own department; he can examine how they work. And third, he can report his problems, ask questions, submit ideas.

There is a workable program. Better human relations must start at the point where we have relations with humans, within the field where our influence can be felt. Only from such beginnings—deliberate effort by thousands of single individuals at thousands of points—can our badly strained patience be kept in hand by patient people until the day when a little more tolerance and understanding are abroad in the world. Or a little more love, to use the Christian word.

One of the soundest and most fundamental ways in which to train people to get along with other people is to teach salesmanship, for whether it be an idea, a job, an appliance, a service or oneself, the fundamentals of selling are the basis of getting along with people. In order to get the entire electrical industry back onto a selling footing from a war footing, the Utah Power & Light Co. is aiding dealers, distributors and salesmen in its various divisions throughout the area served to

FRESHEN UP ON SALESMANSHIP

DEPENDENT now completely on the dealers within its territory for a selling force to build its electric load, the Utah Power & Light Co. has taken the initiative to give that dealer sales force every aid possible to equip it for the job. General Sales Manager W. A. Huckins is not a man to sit and wait patiently without extending a hand to assist. Energetic himself, he has turned his own dynamics from that of managing a company sales force into that of providing the volunteer sales force of all dealers with the tools and training to make better successes themselves. If they succeed in selling the public, he knows his company will benefit.

In a military campaign the shock troops are backed up by artillery and supply services, by air force tactical assistance, by military intelligence and general staff strategy. The shock troops of the sales front, the dealers and dealer salesmen, likewise need logistics, training and strategy. Advertising must soften up resistances ahead of the salesmen. Distributors and manufacturers must keep the supply of things to sell, and sales helps to use in presentation, coming along. Each is busy concentrating on his own product.

It is to supply the over-all general strategy, the military intelligence, the advertising artillery and the tactical air force support to this selling organization of dealers and distributors that the utility company is devoting itself. This it can do directly, as it does in certain activities, or as a partner in the general staff of the industry itself, the directorate of the Intermountain Electrical Assn.

Making no attempt to dominate or monopolize the all-industry association, Huckins nevertheless never lets it sleep on a project it has undertaken to do after consideration by the entire board of directors. On this board are representatives elected from each branch of the industry. They as a group determine the policy and decide the programs. The utility participates actively, but the industry decides. The significance of this democratic procedure is important to appreciate in relation to the sales training program now going on in Utah.

As part of a long-range planning program begun during the war, Huckins anticipated that the sales forces of his volunteers would be depleted, scattered and those remaining rusty on real salesmanship. He foresaw that retraining, refreshing would be needed by those who had survived the war changes. The new recruits to sales forces would need basic training in the psychological fundamentals of salesmanship. He knew that the manufacturers and distributors would take care of their own product training.

Accordingly, in the postwar plans of the sales department there was a place set aside for a sales training director. When Vere C. Halliday returned from military service he was given this assignment. With vigor he plunged into the preparation for this important task. It was decided to utilize the sales training material prepared by the Edison Electrical Institute and National Electrical Wholesalers Assn.

The first step was to make a thorough study of this material. The second was to train a group of trainers, Halliday decided. The third was to present the program, well worked out in advance, to the executives of both the wholesalers and dealers and to enlist their participation in the job. The fourth step was to organize and begin training classes among the wholesalers and distributors by individual companies. And now the next step is to train the dealers' salesmen.

The EEI-NEWA material is packaged to contain a sound slide film for each lesson, a discussion trailer for reviewing the main points in the sound slide film, a leader's discussion and procedure manual and individual manuals for each person taking the course. Work sheets and analysis forms are mimeographed for each group. It was decided that, in order to have each participant have a personal stake in the course he was taking, a charge of $5 would be made to cover the cost of the manuals and forms he received with the course. In some cases the company he worked for refunded this, if the student completed the course and received the certificate which was awarded at the end of the course.

Halliday began with Utah Power & Light sales personnel in order to select from them a staff of trainers to assist in the classes for the industry groups to follow. The others in each sales department who took it would benefit from it as a refresher course. There were 32 meetings held for UP&L people, and 44 persons completed the course, including home service women, dealer contact, lighting and commercial company representatives.

In training company personnel, the course was given in two groups of four concentrated days. It was on company time. Those who took it started at 8 a.m. and for two hours took the work under Halliday, and then had the remainder of the day to do the study and "homework" connected with each lesson. After an interval, the second four days of similar sessions completed the course. Besides taking the lesson that was to be given the sales people, these utility people also took training as trainers or leaders.

Out of the 44 who finished, eight were selected as leaders, three in the Salt Lake City division, two in Ogden, one each in Preston, Rexburg and the Southern division.

Thus prepared, a preview of the

Classes of dealers' salesmen meet mornings at the auditorium of Utah Power & Light under trained discussion leadership

whole program was given to an industry-wide cross section of managers and owners of dealers and distributors, under the auspices of the Intermountain Electrical Assn. This preview gave an hour and a half of the material in the course itself. It illustrated its possibilities. Enthusiastically the dealers and distributors signed up for courses for their own people.

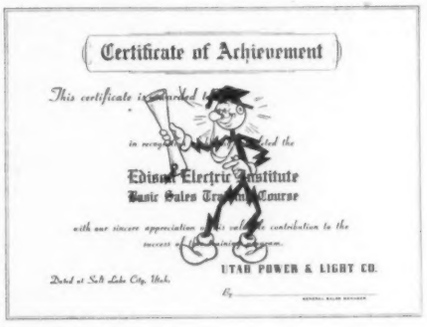
It was decided first to present the course to the sales forces of the wholesalers and distributors in their own premises. Thus General Electric Supply Corp., Westinghouse Electric Supply Co., Graybar, and several independent distributors had courses in their own offices in accordance with their own time arrangements and convenience, the utility furnishing the trainer or leader. This part of the program began in January and by April 19 meetings had been held and 123 had finished the course; more were in process.

The dealers' training program was then begun March 25. The industry, through its directorate of the Intermountain Electrical Assn., decided that the way to handle this part was through the association. Hence the association sent an announcement containing an enrollment blank to all dealers. This followed up a dealer's meeting called by the chairman of the dealers' division of the association, Morgan Sorenson.

From the enrollment thus received, three groups of salesmen for dealers were started in the course, two simultaneously, one on Mondays and Wednesdays, the second on Tuesdays and Thursdays. The third group started later and provided a means of catching up a missed lesson by any attendant of the earlier groups. Average number per group was 18 and attendance was almost perfect for the entire course in each case.

By the end of April all Salt Lake City groups had finished and during May the Ogden classes were run. The other divisions will have dealer classes in the near future. As new personnel is added to dealers' staffs, it is planned to hold more classes for them. With the shortage of merchandise many dealers have not had a chance to build up their sales forces as yet and they feel that when they do the new men and women should also get this basic training course.

It is also being planned to follow up these fundamental training courses


Certificate of Achievement

This certificate is awarded to

in recognition of having satisfactorily completed the

Edison Electric Institute
Basic Sales Training Course

with our sincere appreciation of his valuable contribution to the success of the training program.

Dated at Salt Lake City, Utah. UTAH POWER & LIGHT CO.

By

Certificate given those who complete

with product training. The distributor of each major line of appliances will call his dealers and their salesmen to this follow-up class. In it the special features of that particular line will be emphasized in relation to the selling fundamental previously learned.

As with the Training Within Industry programs conducted during the war, a pocket card, summarizing the points to remember, has been printed by the general sales department of Utah Power & Light Co. and given to each participant who has completed the work. In most cases, too, something of a ceremony was made of the final meeting when a simple certificate of completion was presented to each "graduate." Although the certificate is not a part of the EEI-NEWA material, it was thought that it was something tangible that each student could have to indicate his training.

Out of this experience in conducting a training program for the industry at large instead of an individual sales department, many things were learned. One was that it is preferable to keep classes small; from 12 to 15 is the best size. Thus the instructor can get around to each participant in each session. The best results come from bringing forth discussion from the men and women who take it. Each one should be induced to talk about the principles, to ask questions, to exchange views, to criticize constructively the ideas and demonstrations of the others. Each one should give demonstrations of selling and familiarize himself with the use of the principles taught.

In organizing classes it was also learned that to leave open the time and place led to delay in deciding. It was better to offer one or two choices of times to hold the meetings and the places.

To derive the most from the course, it was also found, the leader must do very little lecturing or talking. Instead he must adroitly seek the answer, even though he knows it himself, from his class. The very effort to bring it forth from one of them serves to emphasize it and to cause it to be remembered longer afterward. In other words, the more the answers can be brought forth as a part of the participants themselves the better it is learned. Leadership serves to pull it out only.

Best by-product of the entire project is that it builds understanding and friendship between all those in the industry, makes them a well coordinated sales team.

To electrical contractors a mention of "getting along with people" immediately brings to mind not their customers or their suppliers so much these days as it does their labor. This has become the No. 1 problem, chiefly because of the shortage of trained electricians. Relations between electrical contractors and their union have long been friendly. It is to their credit that they are tackling this problem together. Throughout the entire West there are active programs for

TRAINING MORE APPRENTICES

IN every gathering of electrical contractors these days, the main topic of conversation is manpower. Materials are still hard to find but it is manpower that really concerns the construction branch of the electrical industry. For it is easy enough to foresee material production catching up with demand in the not too distant future, but not so with skilled manpower.

With men returning from the armed forces in such numbers, eager for a job, and with some skills developed in doing their part in mechanized warfare, it would seem that manpower would be plentiful. Where, it is asked also, are all these electricians who were employed during war production and who were sufficiently skilled to do that work, either in construction or in shipbuilding or war munitions making?

The answers are not as simple as the questions.

Not for nothing has apprenticeship in electrical construction taken a four-year training period in normal times. The truly skilled electrician is expected to be able to handle any kind of electrical installation, whether industrial, commercial, residential, intercommunication, control, outdoor substation or temporary. Besides being an electrician he must also be a good mechanic, a welder, pipe-fitter, painter, and often a concrete man. Some of these requirements are mainly in knowing how to apply his strength, it is true, but in others, such as control and intercommunication system wiring, his skill must be almost that of a jeweler and his mental capacity near that of the engineer who designed the system and drew up the intricate diagrams.

It is no wonder that really skilled electricians are scarce. Very few have been trained within the last ten or more years. Of those who had previously been trained, many are over retirement age and many have died during those last ten years. Many have become electrical inspectors and as such are no longer *producing* electrical workers. Their skills are turned to safeguarding the public against the lack of skill of others. Many have gone into business for themselves and are the very contractors who today need those skilled mechanics. Others have become superintendents and foremen. Still others have taken jobs as maintenance electricians in industrial plants or office buildings, and so are no longer available in construction.

During the war emergency a great many men of little or no electrical training or experience could be used under competent supervision of the relatively few skilled men to perform certain standardized operations. A man could be shown how to do one certain job satisfactorily and since he would do nothing but repeat that one operation many, many times, could turn out the work. It was thus that many women too were employed as electricians in shipbuilding or aircraft assembly.

That these short-time "electricians" were paid the same scale that the really skilled man got was one of the gripes that has caused constant pressure to up wages. Ironically the increased wages go to the unskilled too and do nothing to alleviate the manpower shortage. The only answer is the training of more apprentices.

Apprenticeship training went into a decline in the electrical trade when the building slump of 1928 put so many electricians out of work. In those unhappy days, while everything else seemed to be booming, building construction fell off. Electricians went out doing individual jobs to earn subsistence. There was no incentive to train more men for a trade already unemployed.

In the NRA program shorter hours and work weeks were instituted between contractors and unions to spread the employment. Still there was no need for apprentices. In the days when building began to increase, the balance between employables and employment was a close one and little need was felt for training new men. While some instances of apprenticeship training can be found during those years, it was on a minor scale.

Having reached retirement age or passed it and having worked hard during the war years, a great many of the skilled old-timers want to retire on their union pensions and social security. Besides, their strength and vitality are less and they cannot turn out a good day's work any more.

One of the by-products of this situation has been the hotly debated pension assistance program of the National Electrical Contractors Assn. Finding that its union pension assessments over the years are now insufficient to carry the suddenly peaked load of pension payments to its union members who have reached that age, the International Brotherhood of Electrical Workers has sought assistance from the employer group, the NECA. For many years it had little call on these funds, while its membership was all young. Now that the majority are reaching pension age at about the same time, the funds are insufficient.

The NECA voted, after a hot controversy which almost caused several Western chapters to secede, to contribute to the union's pension fund by paying one per cent of labor pay roll. This has not yet been set up to operate but is in process of being developed. In view of John L. Lewis' welfare fund and that of Petrillo for the musicians' union, this IBEW-NECA program would seem to be part of a trend in labor relations.

It can be said to the credit of the International Brotherhood of Electrical

Workers and the National Electrical Contractors Assn. that they have jointly tackled the apprenticeship problem and are far in advance of the other building trades groups in carrying it through. A national joint apprenticeship and training committee for the electrical industry has been working on preliminary details for several years. E. H. Herzberg, manager of the Milwaukee NECA chapter, is chairman of the committee; Ed J. Brown, president of IBEW, is vice-chairman, and Marion H. Hedges of IBEW research department, its secretary. It has set up standards for apprentice training and indenturing that are being used all over the country either by joint groups of local unions and employers or by the IBEW local and school authorities.

Like anything having to do with people, the success of any program depends entirely on how hard those interested work at it. Existence of standards or rules or suggested programs does not mean that they automatically go into effect. Therefore, the degree of success in the apprenticeship program in the West is spotty. In some cities excellent results are being obtained. In others nothing is being done because nobody is putting any effort into it. In others the results are poor, but only because they reflect the amount of zeal put into the job.

No matter how urgent the appeals and suggestions and directions from either the IBEW or NECA headquarters, it takes a conscientious and hard-working local apprenticeship joint committee, and hard work on the part also of the local business manager of the union and of the contractors association. In this respect the San Francisco program is outstanding. Sacramento has a good program going; so has Stockton. Los Angeles and San Diego both have programs under way. Seattle and Spokane likewise have joint programs and Everett and Medford and San Bernardino, Phoenix and Tucson have IBEW programs, according to Otto Rieman, of the Western IBEW office in San Francisco. Furthermore, all new aggreements contain apprenticeship clauses.

A further indication of the lead which the electrical industry has in apprenticeship training is given in something of which the IBEW vice-president, J. Scott Milne, is especially proud as a Western job. The state association of electrical workers locals is sponsoring the preparation and publication of a text book containing the technical material needed in the apprenticeship school programs in the state of California. This project is costing the IBEW about $2,800 and has been in progress for two years.

Fred Agers, who is president of the Alameda County local No. 595, is the author-editor of the textbook of some 400 pages which will be used by apprentices during their four-year course. It is a practical man's textbook. Agers was an instructor for three years at the Oakland Central trade school. Several other members of the union have contributed material to the text also.

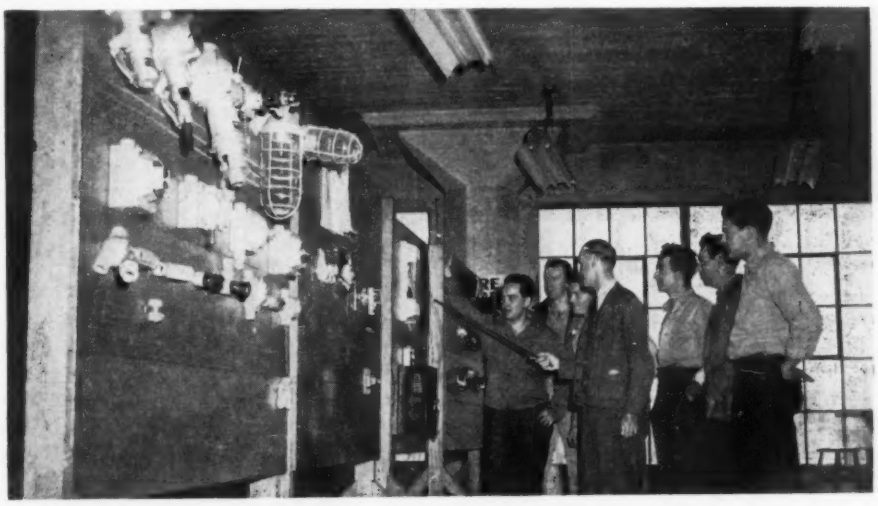
In preparing this text, the union had in mind that, with a standard text and standard programs throughout the state, an apprentice could move to another town and take up his school training where he left off. Rates of pay, too, have practically been standardized in California for apprentices. They are to be paid 35% of the journeyman's wage for their first six months, 40% the second six months, 45% the next, 50% the fourth, 55% the fifth, 60% the sixth, 70% the seventh and 80% the eighth six months; thereafter they get journeymen's pay.

Under provisions of the GI bill, veterans are given additional pay amounting to $65 a month if single, $90 if married, but not to exceed the pay of a journeyman when their earnings as an apprentice and their GI pay is combined. They also are provided with a kit of tools valued at about $100.

Thoroughness of their training can be appreciated from the schedule of process or job training they are to get on the job during their four years, in addition to the attendance at class a minimum of four hours weekly for a minimum of 144 hours per year for the theoretical work.

The schedule of practical experience work calls for: stock room, 160 hours; knob and tube residential wiring, 200 hours; remodeling residential and commercial structures, 350 hours; new wiring in commercial structures, offices, stores etc., 750 hours; extensions to existing light and power systems, industrial, 1,250 hours; new light and power installation, industrial, 1,000 hours; intercommunication and signal systems, 1,000 hours; industrial control installations, 750 hours; underground construction, 800 hours; outdoor substation construction, 500 hours; steel fabrication, welding, etc., 500 hours; industrial trouble shooting, 240 hours; load testing, 200 hours; temporary wiring, 300 hours.

Regular reports are made both to the employer and the union and, where an apprentice is not getting the variety of experience on the job that is required, he can be shifted to other employers. The contractors have pledged themselves to hire their proportion of apprentices to journeymen in the interest of providing themselves with future manpower. In the San Francisco agreement, the employing contractor may have an apprentice for each three journeymen up to a total of five apprentices. He also pays the apprentice for his time at school.



Practical demonstrations with real equipment supplement the classroom theory

Due to the constant attention and stimulation of both W. J. Varley, manager of the San Francisco Electrical Contractors Assn., and Charles J. Foehn, business manager of Local No. 6, and a very active joint apprenticeship committee, the program in San Francisco has an enrollment of 90 and will soon be increased to 200 apprentices. Of the 90, 77 are veterans. There are 16 in the 4-year class on Mondays, 16 the 3½-year class on Tuesdays, 18 the 3-year Wednesday class, 18 the 2-year Thursday and 22 the Friday 1-year class. All are held at the Trade and Industrial Department of the San Francisco city schools at 1663 Mission St. under Robert Farrell, coordinator of apprenticeship training for the building trades. William Weisheimer, former electrical contractor, is the instructor.

Hellenthal Noon Cannon Kirk Collins Siegfried Pollard LeFever

N W ENGINEERS PLOW INTO LESSONS

MORE than 200 Northwest Electric Light & Power Assn. engineers and operating men found they had plenty of experience to exchange at their first postwar meeting in Seattle, April 24-26. Chairmen of the six Engineering and Operation Section committees, presiding in turn over conference meetings, were forced to keep the gavel busy, in order to cover the ground.

War experience which can be utilized in peacetime, and current situations growing out of the war—particularly labor costs and material shortages—were sure-fire topics, as were a variety of bread-and-butter questions which everyone for several years has been too busy carefully to examine.

C. F. Terrell, vice-president of Puget Sound Power & Light Co., referred in his welcoming address to the continuing nature of this latter difficulty. Whereas war's end had been anticipated as an occasion for catching up, it actually turned out to be the beginning of a fresh onslaught of operating difficulties reaching into every branch of the industry. Now, he implied, is the time to resume periodic meetings for the exchange of information, because the day when there will be plenty of time to spare is not in sight.

Following Terrell's welcome, Section Chairman R. J. Davidson, Pacific Power & Light Co., introduced Association President Patrick Johnson. Pat Johnson emphasized the interrelated character of activities in every part of the electrical industry, recognized by the association in an attempt to expand its membership to include electrical contractors and dealers, as well as more manufacturers and wholesalers. Following the thought with the deed, Johnson, although himself a salesman, attended the engineers' sessions.

Formal papers were few, most subjects being launched by a sponsor who outlined the scope of a problem, discussion proceeding from that point under guidance of the committee chairman. In brief:

Power Production

Power Production Committee Chairman: A. L. Pollard, Puget Sound Power & Light Co.

Northwest Power Pool. M. L. Blair, Washington Water Power Co., outlined operating experience. The five-state pool involves eleven major systems and a few smaller ones and is usually handling some 700,000 kw. Pooled operation adds about 300,000 kw. to the effective combined capacity. Effectiveness of the pool, built up out of improved ties, improved communications, and operation of each system to the best advantage of the pool as a whole, has saved fuel and improved service. Strength was recently demonstrated when Grand Coulee dropped out while carrying 400,000 kw. Practically the entire load was carried by the remainder of the pool; frequency fell off 3 to 4 cycles temporarily; in general the pool held together and normal operation was restored in 20 min. All parties to the pool, Blair emphasized, must firmly keep in mind its benefits to the common good, if these are to be maintained, for pooled operation in the postwar period will require surmounting difficulties in: (1) contractual relations, (2) government regulations and (3) individual operating habits.

Plant Maintenance. Participants agreed that most deferred maintenance has not proved as hazardous or costly as was expected. E. H. Collins, WWP Co., thinks concrete dams may prove to be an exception, as far as costs are concerned. Replacement-part shortages have compelled a variety of expedients, many of permanent usefulness. Shifting of concrete is under suspicion in two or three plants as the possible cause of bearing wear and related troubles. Studies of various groups, electrical and otherwise, concerning the nature of concrete "growth" are being watched with interest. A recent, speedy job of "Hydraulic Turbine Repair At Rock Island Station," was described in detail in a paper by H. O. Barber, Puget Sound P&L Co.

Electrical Equipment

Electrical Equipment Committee Chairman: J. Hellenthal, Puget Sound P&L Co.

Low-Cost Substations. C. E. Cannon, WWP Co., outlined such money savers as wood instead of concrete foundations, omission of breakers and regulators and minimum use of spares, suggesting there may generally be a tendency toward overrefinement of design. A. Shipek, Puget Sound P&L Co., diagrammed a typical substation; he gave 1943 costs of a 13.8/4.16-kv., 3,000-kva. substation with four feeders at $11.04 per kva. John Bankus, Portland General Electric Co., cited elimination of one transformation by distributing at 13 kv. Y as one approach to lower costs. Labor costs were mentioned as giving rise to the necessity for keeping wiring at a minimum.

Remote Control and Indicating Equipment, as applied to a substation at Sumas, Wash., was described in a paper by Albert A. Noon, Puget Sound P&L Co.

Breaker Maintenance. R. C. Kelley explained the point system set up by WWP Co. to establish a schedule for circuit-breaker inspection.

Miscellaneous Maintenance. At least

Vice-Chairman Gamble Chairman Davidson President Johnson

two systems felt that equipment on which regular maintenance schedules had been suspended during the war had stood up better than had been expected—a fact which would lead to revising future schedules.

Transmission and Distribution

Transmission and Distribution Committee Chairman: C. H. Kirk, Montana Power Co.

Mechanization. Application of machines to more kinds of work is resulting from new costs. A. I. Sawyer of Idaho Power Co., as an example, mentioned increases of 39% in linemen pay and 25% in transportation cost as typical of one area over the past few years. Such trends have emphasized the usefulness of: (1) handling equipment at warehouses to get poles aboard carriers quickly and crews under way with minimum lost time, (2) fast transport, in some instances bus or station wagons to carry personnel separately from line trucks, (3) more equipment on the job, including tractors, bulldozers, hole diggers, handling devices, and power hand tools. Two systems mentioned a trend toward bigger trucks—higher horsepower and 4-wheel drive.

A. L. Pollard emphasized morale, pointing out that good equipment can be a real help to, rather than a supplanter of, men. He also scored with the comment that as far as diggers were concerned the current difficulty is often that of having more holes than poles.

A. C. Kelm, Utah P&L Co., suggested that if a little mechanization was good a lot might be better; for example, a $1,500 compressor increased pole-digger efficiency by 40%, enabling teamed equipment to operate in a greater variety of soils, and permitting mechanical tamping which often is more compact than the original earth.

Montana Power Co. men told of using a flying service for patrolling; in one instance lightning damage in the mountains at 6:30 p.m. was located by plane within 20 min., permitting immediate assembly of men and equipment for a job which otherwise could not have been organized until next day.

Native Poles. Scarcity of cedar stimulated discussion of substitutes and preservatives, revealing wide variations from system to system. Few found fault, however, with osmotic application of sodium fluoride; F. O. Wollaston, B. C. Electric Railway Co., gave costs as $2 per pole before setting, stated that whereas nearly 100% of 200 untreated fir poles were ready for renewal in three years, decay was arrested in 59% of them for seven years thereafter (to date) by osmosis.

Kelm discussed a variety of pole-life data being carefully considered on his system, flatly declared himself against creosoting green poles. There is particular interest in lodge pole pine.

L. R. Gamble, WWP Co., told of stubbing poles for $20-$25 each with 8-ft. railway ties of treated fir and larch, set 4½ ft. deep and fastened with two bolts.

Standard Time. Effect (with other contributing factors) has been higher peaks and lower load factors, according to Carl Myers, Puget Sound P&L Co. F. H. Ferguson, same company, said a 90-day short course for linemen is aimed at expanding personnel to provide for next winter's loads.

Rural Lines. Glenn R. George, WWP Co., said contract construction of rural lines on cost-plus has been exceeding estimates by 14% to 32%. Paul Ashworth, Telluride Power Co., suggested

Terrell LeFever

Crawford Blair

Bankus

that longer spans might bring more trouble with conductors, less with poles and arms. Montana Power gives each new rural customer a booklet on wiring standards aimed at encouraging qualified contractor wiring and discouraging the home mechanic. Cecil L. Brown, Pacific P&L Co., submitted a paper constituting a comprehensive summary of "Rural Line Voltage Regulation."

Communications. W. H. Blankmeyer, Montana, described utility communications trends as toward radio for emergency, special telephones with more power for operations and PBX with special repeaters for the commercial department.

Tree Trimming. Work by professional tree surgeons was favored both as to costs and public relations. H. M. Jones, Idaho Power Co., gave long-term costs on contracted work covering 90,000 trees per year as $1.47 per tree. Recent per-tree rates elsewhere have run as high as $2.25, neither the time nor the kinds of trees being strictly comparable.

Electrical Code

Code Committee Vice-Chairman: M. T. Crawford, Puget Sound P&L Co. (presiding in absence of Chairman S. B. Clark).

Code changes were discussed in detail. C. S. Alger, Puget Sound P&L Co., reported on a Washington state proposal to raise contractor licenses from $50 to $100 and to require journeyman wiremen to pass examination and pay $5 license fee.

Planning

Planning Committee Chairman: O. L. LeFever, Northwestern Electric Co.

Radio and Carrier Telephone services to be made available by Bell system companies were described by R. E. Kistler, Pac. Tel. & Tel. Co. He described studies for establishing telephone service via FM radio in the Seattle area.

Utilization

Utilization Committee Chairman: John Bankus, Portland General Electric Co.

House Heating. W. L. Sharp, Portland General Electric Co., gave preliminary evidence obtained from recorders on some of the 700 homes electrically heated in Portland. December morning peaks averaged 7 kw. per house with unit heaters, 9-10 kw. with central furnaces; evening figures were 5.3 kw. and 6.4 kw. respectively. One 30-kva. transformer successfully fed 14 customers having two 20-kw. central furnaces, 11 ranges and 9 water heaters. The data-collecting program will be expanded, a necessary preliminary to estimating the potential markets.

R. C. Setterstrom, Montana, suggested the possibility of billing customers for house heating in equal monthly installments with a year-end adjustment for errors in estimation.

V. B. Jones, Tacoma City Light, recalled that many Tacoma heaters installed in the 20's were taken out in later years when money became tight. Tacoma is studying its house-heating rates, feeling that the last-block rate may possibly be too low.

Paul Marble, Puget Sound P&L Co., said a few small commercials, such as groceries, were using electric space heating with satisfaction but that attempts to heat large areas of high heat loss had not proved satisfactory.

M. M. Ewell, Westinghouse Electric Corp., Portland, described successful applications of inductive heating in steel foundries and plywood plants.

Assorted Events

R. D. Horning, manager of the Seattle Electrical Contractors Assn., appeared as a guest speaker, setting forth the benefits derived by contractors from organization and presenting reasons for the employment of contractors by utilities for line construction.

Once again the meeting included the annual dinner and entertainment, staged this time by a committee headed by Charles H. Cutter, Pacific Electric Mfg. Co. Closing event was an inspection trip to the wind tunnel at Boeing Aircraft Co., Seattle.

Record Splash

It took just 10½ minutes to lay San Diego Consolidated's 3,600-ft., $20,000 submarine cable under San Diego Bay. This is the company's fifth cable to Coronado, although the first, laid in 1918, no longer carries power. The new one is a 15,000-volt job, tailor made by Okonite, consisting of three 500 M circ.-mil stranded copper conductors and three communications pairs. Two-way radio helped speed up the laying, which was under the supervision of J. B. Bowen, superintendent, with Jack Brown acting as supervisor.

High-Speed Giant

Setting records for size and steam temperature in the field of 3,600-r. p. m. machines is one under construction by General Electric Co. for the Public Service G&E Co. of New Jersey. The generator is rated 95,000 kw., and the turbine will take steam at 1,000° F., 1,250 p. s. i.

The turbine, a tandem-compound double-flow unit, will incorporate 19 high-pressure stages and 5 double-flow low-pressure stages. The last-stage wheel will carry 23-in. long buckets of variable-angle double-warped airfoil section, which will operate at a maximum top speed of 1,390 ft. per sec. Eight extraction points are provided. There is no reheat.

Generator rating is 0.85 power factor and 0.85 short-circuit ratio at 15 p. s. i. gauge hydrogen pressure. A 7,500-kw. house alternator will be direct connected. The set is scheduled for delivery in early 1947.

Engineering College Notes

Cal Tech

At California Institute of Technology, Dr. Frederick C. Lindvall, professor of Electrical and Mechanical Engineering, has been appointed chairman of the Division of Engineering. Additional facilities have recently become available through the completion of a Mechanical Engineering Building.

Possible curriculum changes have been explored but the results were quite generally a confirmation of the broadly basic curricula which had been developed prior to the war period during which the Navy V-12 program was followed. Provision has been made for special emphasis upon instruction in advanced engineering mathematics and advanced applied mechanics.

As is the case in most engineering colleges, enrollment is unbalanced, being relatively small in the junior and senior years and crowded in the freshman and sophomore years. Of the enrollment of a freshman class admitted in March to continue without interruption during the summer, nearly 90% were returned servicemen.

The Graduate School enrollment of engineers is currently as large as at any time prior to the war with prospects of even larger enrollment in the fall.

Fig. 1

Fig. 2

FIGHTING WEAR ON HYDRO WORKS

RECENTLY completed on the Southern California Edison Co. system were a series of repairs to the company's hydro facilities in the southern Sierra Nevada Mountains. Because fall through which water in that area is made to work, each gallon at the higher elevations has an unusually high value in kilowatt-hours. Improvements to the hydraulic system therefore reflect themselves in exceptionally large benefits to the electric system. While this consideration justifies extreme measures to maintain flow of water, many features of the various jobs are typical of modern maintenance practice and illustrate techniques applicable to systems operating on much lower heads.

Ward Tunnel Repair

Ward Tunnel is a 13-mile bore of 16-ft. diameter for the purpose of diverting water from its normal streambed into Edison's Huntington Lake reservoir; when so diverted an extra 4,600 ft. of fall becomes usable in the Big Creek power plants. Periodic inspections had revealed the development of a progressive fissure near the tunnel roof at a point about 11,000 ft. from the tunnel outlet (the nearest point of access).

Repairs were therefore scheduled for the autumn and early winter of 1945, the seasonal period when the work could be undertaken with minimum loss of water.

Access being one of the most expensive features of the job, it became feasible to take advantage of the fact that men and equipment were going in anyway by taking care of other repairs at the same time. As a result $315,000 worth of work was undertaken, Grafe Callahan Construction Co. being the contractor. Difficulties of the job are illustrated by the fact that only $35,000 of this amount was for repairs proper, the remainder going for access, construction facilities, a diversion bulkhead, and getting men and equipment to the scene of the work.

Work started (Fig. 1) with the cutting of a keyway into the old concrete wall, or into the rock where the wall was missing, for the purpose of supporting a concrete strut. A timber cribbing was then built into the fissure and forms put in place. After suffering a power cable failure, Grafe Callahan ran a 50-kw. emergency diesel m-g into the tunnel for the purpose of operating pump-crete equipment with which 65 cu. yd. of concrete were pumped into the fissure.

Costs on this portion of the contract were $17,000 for the strut together with 450 cu. yd. of concrete floor, plus $170,000 for access and equipment to make ready for the actual pumping and pouring of concrete. Fig. 2 shows the strut in place.

Borel Canal

Since its construction in 1904 Borel Canal has been subject to deterioration through rock dribble, and breaking up of the original lining, as indicated by Figs. 3 and 4. Repairs were made on the sections showing the most deterioration principally in the lower 10 miles of the canal. The upper portion, of similar length, may later be submerged by the projected Isabella flood control reservoir. Throughout the 20-mile length of canal, 15 sections aggregating 15,500 ft. and nine flumes aggregating 4,825 ft. were repaired.

Work on the canal consisted of cleaning and blowing, placing welded steel wire reinforcing mesh, water-spraying, applying 1½ in. of gunite to walls (Fig. 5) and troweling. The floor was handled in the same way, except thickness was 3 in., poured (Fig. 6).

For the above facing of the banks a portable plant was employed, consisting of an air compressor, mortar gun and special material hopper, all pulled as a unit by a pneumatic tired tractor. Trucks hauled premixed material from a central mixing plant to the portable placing plant. One gun crew with a 315-cu. ft. compressor placed from 5,000 to 6,000 sq. ft. per 10-hr. shift.

The lining was placed without shrinkage or other joints; experience elsewhere had showed that minute shrinkage cracks occurred anyway, unless joints were so close as to be impracticable, and, furthermore, efforts to insert sealing strips greatly complicate construction without offering very satisfactory results.

The semicircular metal flumes presented 182,000 sq. ft. of surface, which was cleaned and painted with hot asphalt (Fig. 7).

The work was done by Morrison-Knudsen Co. for $275,000.

Kaweah Canal

The Kaweah No. 2 and No. 3 canals underwent similar repairs, except the lining was gunite throughout. Size of these canals varies, mostly between 4x6 ft. and 5x12 ft. The refacing, which varied according to the canal and the type of ground through which it passed, consisted of 556,000 sq. ft. of ½-in. unreinforced gunite and 127,000 sq.ft. of 1-in. reinforced gunite. This work was done by Clyde W. Wood Co. for $266,000.

Macco-Case Construction Co. undertook the flume rebuilding part of the Kaweah work for $91,000. This required construction of 3,700 ft. of access road in order to reach three old wood flumes (Fig. 8) totaling 1,917 ft., which were torn out and replaced with steel Lennon type flumes (Fig. 9) involving 230,000 lb. of steel.

Backfilling Dams

The ubiquitous problem of concrete deterioration from periodic freezing is especially troublesome at higher elevations in the West such as at Huntington Lake, where for much of the year the freeze-thaw cycle occurs daily. Fig. 10 illustrates the results, which are often more severe than they appear here. Edison currently favors earth backfill as the preventive.

At Huntington Lake, earth back-

Figs. 3-7 at left and below

Fig. 8

Fig. 9

fill was applied to the upstream face of three dams wherever it would not interfere with operation. The downstream faces were backfilled some years ago. Grafe Callahan did the work for $71,000, the project requiring 37,000 cu. yd. of earth fill and 6,100 yd. of riprap.

Later it is planned to apply concrete or steel facing to those parts of the dams where earth filling is not practicable.

Kern River No. 3 Tunnel

Repairs to the Kern River No. 3 tunnel constituted the other major contract in the maintenance program under discussion. The work was done by Morrison Knudsen for $310,000. Included was guniting 380,000 sq. ft. of wall and 172,000 ft. of floor of the 8x9-ft. tunnel to a minimum of ½ in.. painting the walls, and cleaning and painting 32,000 sq. ft. of syphon and 90,000 sq. ft. of penstock.

The walls were treated as follows: (1) organic material and loose concrete were removed by successive use of a power-drawn jumbo wire broom and power-driven wire brushes; (2) further cleaning was accomplished by blowing down with high-pressure air and water using the mortar-gun nozzle; (3) the surface was flashed with thin mortar for a bond coat; (4) gunite made with natural sand passing No. 8 screen was applied to at least ½-in. thickness; (5) a finishing coat of gunite was applied and troweled smooth after sufficient set had occurred; (6) after thorough cleaning and hair brushing, two coats of glossy coal tar paint were applied.

The reason for painting was that previous inspections had accidentally revealed the protective qualities of coal-tar paint. Where someone years before had applied a thick coal-tar paint to seal a shrinkage crack, both concrete and paint were in excellent condition, while concrete on each side was eroded and rough. Since the work was done largely to improve the tunnel's coefficient of friction and increase carrying capacity, particular attention was given to smoothness.

Floors were dragged with heavy harrow-toothed weights, bloom cleaned, washed in the same manner as the walls, gunited and troweled. Paint was not applied because considerable debris is carried along the tunnel floor by the water, so that paint would very quickly be worn away.

Equipment "De-priced"

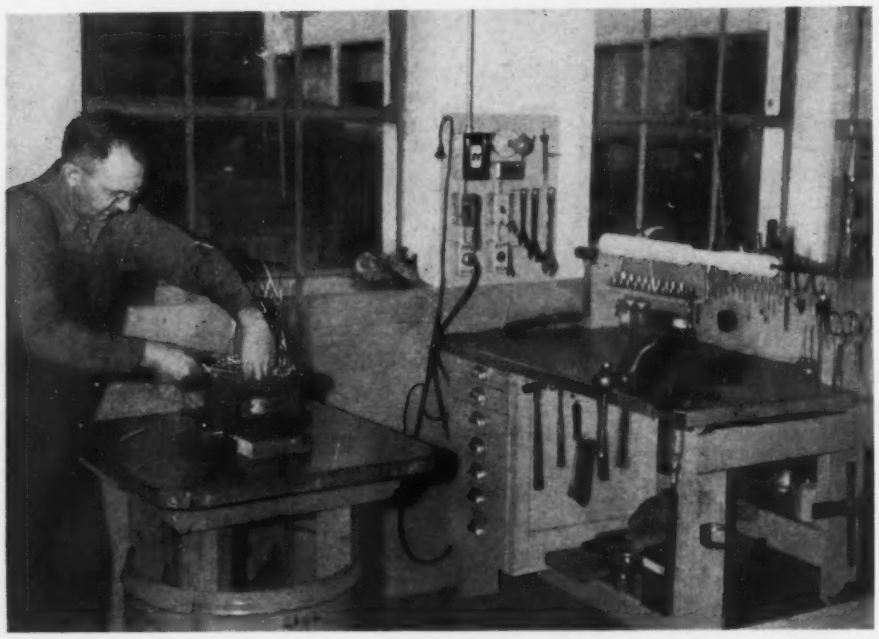
In what it announced as a step toward its intention of suspending price control over electrical transmission equipment, with the exception of wire and cable, OPA suspended controls May 24, on: coils for transformers and rotating machines; distribution cutouts (not including building equipment and supply items); specified types of high-voltage insulators; pole-line hardware; power switching equipment for more than 601 volts; repair and replacement parts for equipment suspended from control (under certain conditions).

Detailed reading of the order is necessary to determine exactly what insulators and associated equipment are included, and the circumstances under which repair parts fall within the scope of the suspension. Items included are additional to those on which controls were lifted April 8.

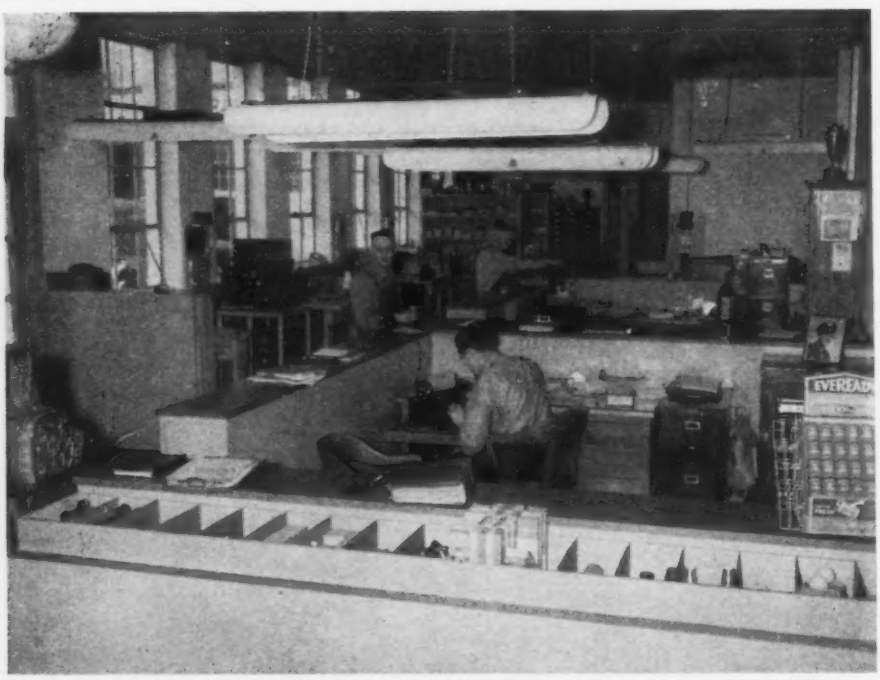
On May 23, manufacturers and resellers of automatic electric temperature controls for heating, air conditioning and refrigeration were authorized to raise prices 20.8% over those for Oct. 1, 1941.

● Statistic From Occupied Europe: Electrical generation in the American Zone is running about 400,000 megawatt-hours per month. By way of comparison, this is a little less than the average for Oregon, half that of Washington, less than a third of that for California.

Fig. 10



ONE MAN'S BUSINESS



SOMETIMES what looks like a calamity may turn out to be a blessing. So it was, William Hopper felt, when his Gem State Electric Co. was up against double-the-rent or moving from a location occupied for 26 years in the downtown shopping district of Boise, Idaho. Now that the move has been made and Gem State Electric Co. has much better quarters for every part of its business at 714 Grove St., Bill Hopper wonders why he didn't move long ago.

With the move came also a definite change in his type of business. As an electrical contractor-dealer, in a shopping district, he had always carried appliances and a large stock of lighting fixtures. He had done residential wiring as well as commercial and industrial. When the change was made he decided to let the domestic lighting business go and with it house wiring, and to concentrate on commercial lighting, industrial and commercial installations instead.

"It's getting so anybody can wire a house," said Hopper. There was sarcasm in the remark, for he illustrated it with a piece of non-metallic sheathed cable which had been crudely tapped and had caused such trouble that the house had had to be rewired.

"Oh, the house-wiring business is all right, but as I say, there are so many getting into it. Besides, you wire a residence for a customer and you do one job that lasts for years. With a commercial or industrial customer, you get much more repeat business for additions and improvements, and it is all 30-day business.

"I used to stock about 1,000 residential lighting fixtures and it seems to me we never had the right one. We did well enough with it, but it was a lot of trouble for each $10 order."

At the new place, Hopper has a 50-ft. frontage on Grove St. between a service station and a large parking lot for buses. This gives him plenty of daylight from both sides and makes his shop visible from three streets. The present building will be stuccoed and a sign placed on the roof that will be visible across the bus lot to the next corner on Capitol Blvd.

In the new space, 120 ft. deep and 50 ft. across, the front portion is made the office of the firm. Immediately back of the office and in full view, is the motor repair shop. This is kept neat and makes a good appearance from the front, where it can be seen by passers-by. There are four work benches located alongside windows.

A small display of new or rewound motors and industrial equipment is kept in the show windows at the front. The office space is behind a counter at the front, and a separate office space next to it is rented to the Otis Elevator Co. for its service man.

Motor parts are kept at the rear of this front shop. Fluorescent industrial 2-lamp fixtures on individual switch are over each bench.

With a driveway alongside, the receiving room is at the back of the shop where a crane rail is provided to lift heavy motors and equipment off trucks. This driveway provides a private alley which will later be paved.

To the rear of this receiving room there is the warehouse and a wing adjacent is rented to a machine shop. This machine shop did all of Hopper's machine work in the past. By mutual arrangement both moved at once. It makes a convenient location for the machine shop and relieves Hopper the need to invest in machine tools of his own.

Old motors are received at the shipping entrance, where they are cleaned and stripped of their old wirings. Then they are placed on dollies which are wheeled into the repair shop for rewinding.

Back of the receiving entrance is a large warehouse. "We have moved the basement onto the first floor," says Hopper. The warehouse is equipped with a mezzanine which provides extra storage space for lighter weight items such as lamps and fixtures. The main warehouse contains a fine supply of wire, switches, etc. and has an entrance at the rear on another alley.

Hopper services motors up to 30-hp. and maintains that baking the varnish is unnecessary, and therefore has no bake oven. The motor business, he's found, carries with it considerable industrial work. The war with its scarcity of motors has made the servicing of motors imperative and by keeping on hand a loan collection of motors he has been able to keep most of his customers running until the motors could be rewound.

The new location of Gem State Electric brings considerable drive-in business. Always a good lamp dealer, Hopper feels that his lamp business has actually improved from this location. Besides, he feels that, should he desire to sell any type of merchandise, he has the space and facilities to do so.

His son, now back from duty with the U. S. Navy, has joined the business. In every respect then, Hopper feels that his former landlord did him a good turn by doubling his rent. The move he has made has proved such an improvement in every respect.

The Light Touch

Seattle City Light, in producing a booklet, *Wise Planning for Your All-Electric Home*, has remembered what too often is forgotten: that the homebuilder has pretty pictures in his mind. "Wise Planning" glamorizes the home. The booklet is clean and attractive. The photography is excellent. The explanations are clear.

In these ways it promises to reach out and convince homebuilders where equally informative but heavy handed treatments would not. For instance, the recommendations on where switches and outlets should be located may add little to what already may be found in many places, but the homebuilder will be far more likely to read them spaced out on high-grade paper, decorated in blue, and embellished with photographs of the corresponding rooms.

It serves also as a neat vehicle for plugging the services of City Light.

LIGHT LAW SAYS "IES"

HAVING direct impact on industrial and commercial lighting activities in the state of Washington and suggesting implications as to future standards of lighting elsewhere is a combination of orders which writes IES standards into Washington law. Both orders come from the state's Department of Labor and Industries and in their significant combination are effective as of June 4.

First step in this legal build-up is the "General Safety Standards" published by the department's Division of Safety. These standards, revised with an effective date of Nov. 1, 1945, contain the following as Standard 14 of the "Safe Place and Safety Device Standards":

"*Lighting and Illumination*—A level of illumination shall be maintained for the various types of jobs in all shops, at least as high as that recommended by the standards of the Illuminating Engineering Society."

In broad terms the General Safety Standards apply to extra-hazardous work or occupations coming under the provisions of the Industrial Insurance and Medical Aid Acts of the state. They do not prevent the use of properly maintained and safeguarded existing equipment throughout its lifetime. The lighting and illumination standard falls within a group where "reasonable compliance" is enforced in exceptional cases, such as those where unreasonable costs or no contribution to safety would be involved.

Tied to these standards is Order No. 1-A of the department's Industrial Welfare Committee, entitled "Minimum Wages and Minimum Standards of Working Conditions for Women," reading in part as follows:

"It is hereby ordered that the following . . . minimum conditions of labor for women employed in industries, plants, yards, shops, stores, factories, offices, places of amusement, and any and all other places within the state of Washington where women are engaged in any kind of work or enterprise for any kind of compensation, shall be effective within the state from and after (June 4) . . ."

"Sec. 11. *Lighting.* Every room in which women are employed shall be supplied with natural or artificial light in accordance with the General Safety Standards of the Department of Labor and Industries. Sufficient illumination shall be provided for each woman, irrespective of her position on the floor space."

"Sec. 17. *Individual Exemptions.* In cases where in the opinion of the Supervisor of Women in Industry, after due investigation, the enforcement of sections . . . 11 . . . would not materially increase the comfort, health or safety of employees and would work undue hardship on the employer, individual exemptions may be made . . ."

Help for Road Light

High on the action program put forth by the engineering committee of the President's Highway Safety Conference, held in Washington recently, was the recommendation that modernized lighting be applied on main urban streets and on the more hazardous sections of highways where there is considerable pedestrian traffic. It was pointed out that modern lighting is one of the most important contributors to the saving of lives on the nation's highways.

This was perhaps the first time it has been publicly acknowledged that adequate street and highway lighting is a major traffic life saver, and the electrical engineer is finally directed to apply his art. Traffic engineers are operating on the basis that free-ways will ultimately be lighted as well as the best-lighted streets to be found in the cities.

"A major possibility for traffic-accident reduction through safety engineering lies in making highway use safer during the hours of darkness," the committee's final report asserted. Though less than a third of the traffic is at night, about 65% of the traffic fatalities and 48% of all traffic accidents occur then.

More emphasis than ever before will be placed on the safety records of such cities as Salt Lake, where installations of lighting systems in certain localities have materially reduced the traffic toll.

In congested regions, reasonable taxes, if used for highway purposes, can provide multilane roadways, grade separations, controlled access, lighting and all the other safety arrangements yet devised. In many instances, existing lighting systems can be modernized at a relatively small conversion cost by the use of fixtures that more efficiently direct the light onto the pavement. In this way, as well as by the installation of entirely new equipment, satisfactory illumination levels approaching or equaling those recommended by the Illuminating Engineering Society for various street and highway conditions

can be obtained, the report summarized.

Cost of street and highway lighting, where conditions indicate the need, can often be justified by reduced economic loss and lower insurance rates. The saving of some of the lives now being lost on the highways would well justify the half billion dollars the IES recommended be spent in lighting the streets of the country.

Further development of lighting systems by experienced engineers will pay large dividends in lives saved and property damage reduced, the committee told the conference.

Metals Firm Uses H-F Heat

A NEW type of electronic induction heater is finding its first Pacific Coast application at the Dexter Metal Treating Co., 1026 77th Ave., Oakland. It is a 15-kw. 530 kilocycle unit furnished by General Electric Co.; output current is approximately 200 amp. at full load.

The new machine is suitable to all kinds of induction heating, such as surface hardening steel parts, dies, tools, as well as brazing, soldering, and annealing application. A copper inductor coil is shaped for each different-sized piece to be treated and when current is flowing the piece is rotated, thus insuring uniform heat.

The rotating mechanism, a triaxial device, is electrically driven and automatically indexed and contains a hydraulic lifting mechanism. The heating sequence, which is generally less than a minute in length, is governed by a master timer which can, of course, be reset as needed for the various types of work. Induction heating has the following three major advantages in addition to speeding up the heat-treating process and lowering the cost:

(1) Heat is generated inside the work itself.

(2) Heat is applied very rapidly.

(3) Heat is localized and controlled precisely.

The heart of the set is a large oscillator tube which has found use in the television and FM broadcasting fields as well as induction heaters. It has expected life of 7,000 hours.

The set has four doors, two on either side, for servicing. Should the unit be operating when the doors are opened, an interlock automatically shuts off the machine. An overload relay is provided.

Recently formed, the Dexter Metal Treating Co. is run by Roger Dexter,

Heater, Lewis, Dexter

formerly chief metallurgist of the Chicago Screw Co. and head of its heat treating department for some 15 years, and Harry Lewis, for 18 years an industrial heating specialist for General Electric Co. Besides induction heating they will do Chapmanizing, carburizing and hydrogen brazing.

Will H-F Heat Cure Colds?

Dark hints as to what medicine may do with high-frequency power are frequently contained in summaries of new scientific tools available to the postwar world. In the following, the dark hint is replaced with a careful digest of the history and possibilities. The information is extracted from a part of the paper "Industrial Heating at Very High Frequency," by I. E. Nouromtseff of Westinghouse Lamp Division, presented at the New York meeting of the American Institute of Electrical Engineers.

The first high-frequency apparatus for medical purposes was built by the noted French physicist d'Arsonval several years before the advent of radio; "d'Arsonval currents" were of relatively low frequencies. About 1930, the so-called "fever machines," introduced by Dr. Whitney in this country, gained popularity. These machines, employing 30 mcs. and later 60 mcs., had the purpose of raising the temperature of the human body to 104° and even 105°. The procedure proved to effect the cure of common colds, some cases of arthritis, and other ailments. It was demonstrated, however, that a similar effect could be achieved by any other method of heating, such as hot air, steam baths or hot pads. The advantage remains with the h-f machines because of the convenience of handling and applying h-f fields to various parts of the body.

For almost 20 years it was the opinion of some specialists that the most effective cure for certain critical internal diseases, such as lung absesses, some malignant growths, enlarged prostates, etc., could be achieved by application of 150 mcs. or greater frequencies. The strong proponents of this idea were Professor Schliepahacke, and Heinrich, in Germany, and a physicist-engineer, Dr. Lakhovsky, in France. They insisted that high frequencies up to the microwave region either had a selective effect on different internal organs or produced some other physiological effect different from the simple heat effect. Both experimenters claimed remarkable results.

Dr. Lakhovsky insisted that of particular value was oscillatory energy applied in pulses producing complex wave forms rich in harmonics. Whatever the actual effect of the extremely high frequencies, the remarkable cases of recovery officially certified by several hospitals and doctors of repute cannot be disregarded.

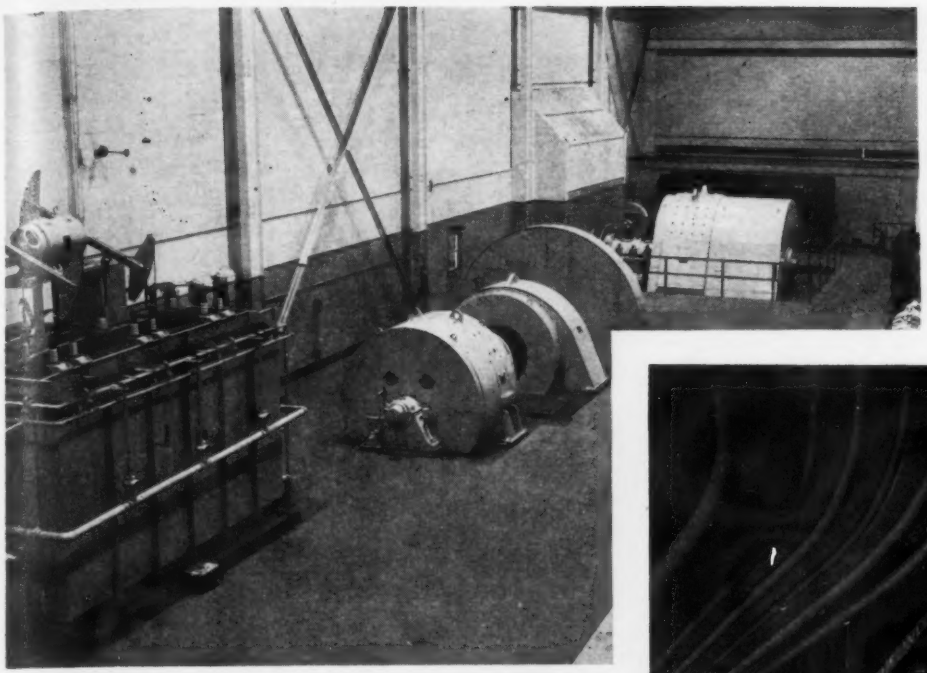
The new generators of extremely high frequencies now available offer possibilities for exploring this new realm. If the hypotheses of the pioneers are confirmed, the frontiers of usefulness of ultra-high frequency fields may greatly expand to the benefit of humanity. The specific advantage of microwave power in medical applications may be the possibility of administering it by highly concentrated beams focused on an ailing internal organ or a spot of the skin.

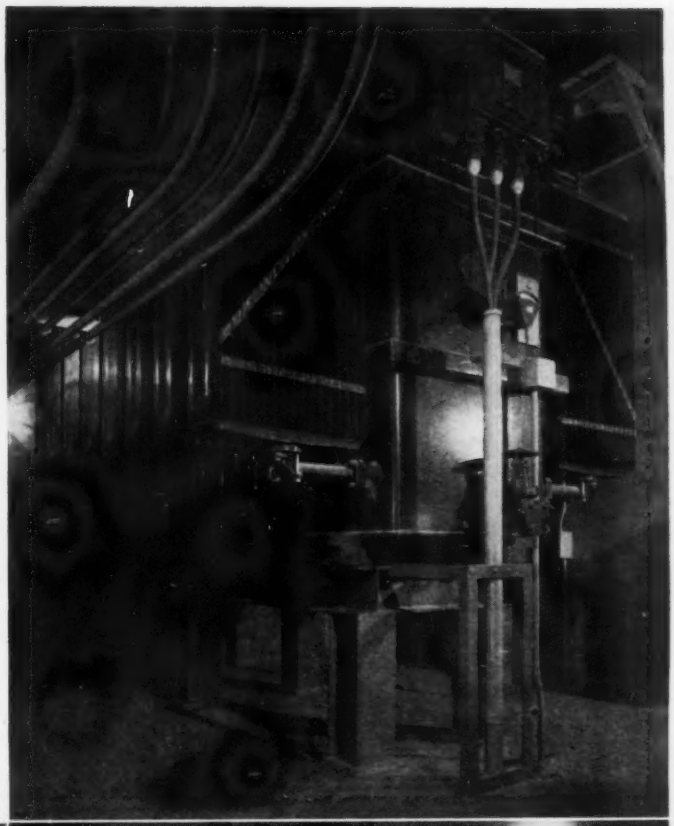
Germ "Light" Meter

Just as the engineer and salesman of light for light's sake have been armed with the light meter as standard equipment of their trade, those dealing with light for the sake of killing germs may now have a device of their own. It is the portable electrical air sampler, developed by G-E for the purpose of making an accurate count of air-borne bacteria.

While lacking the fine simplicity of the light meter—you can't tell the number of bacteria by looking at a pointer—it nevertheless makes possible quick, accurate sampling without cumbersome equipment. The device is about the size of a shoe box and weighs 12 lb. It takes in air by means of a blower and utilizes static electricity to deposit negative-charged germ-laden particles on dishes coated with nutrient jelly. Germ count is obtained after 40-hr. incubation.

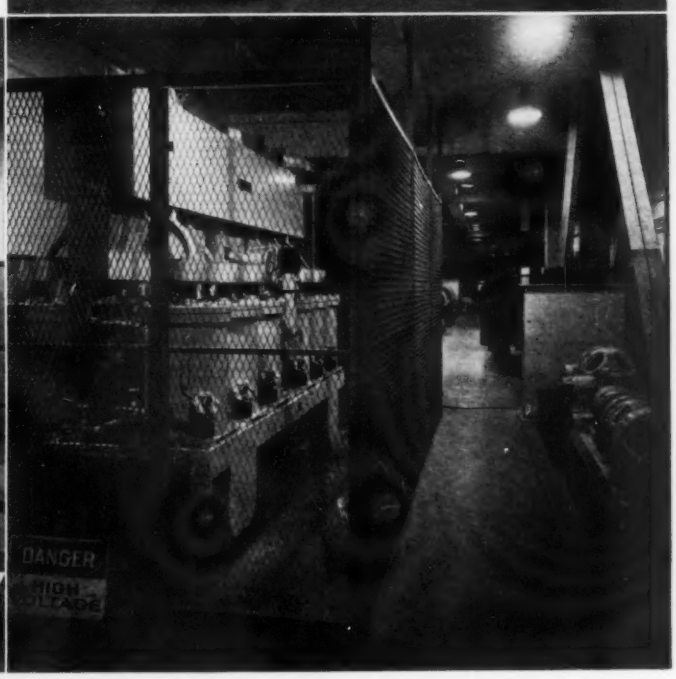
POWERING A STEEL MILL





Fontana, Calif., steel plant of Kaiser Co. Inc. affords good view of modern industrial d-c equipment. Above left: liquid-slip regulator at left provides secondary control for 4-unit, 5,000-kw. flywheel m-g set's induction motor, center; m-g set powers 5,000-hp. reversing-mill motor, rear; exciter m-g sets at right. Right above: 3-phase, 6,600-volt transformer supplying 2,500-kw. rectifier in merchant mill. Right below: The 2,500-kw. rectifier, comprising twelve 15-in. Ignitron tubes supplies d-c for 14 main-drive motors; motors must start on low voltage, so automatic phase shifters are employed to control the rectifier output voltage. Below left: On left is 22/85-kva. m-g set supplying a-c to group of approach-table motors; next is 400-hp., 600-volt d-c motor driving mill stand; 14 motors range from 100 hp. to 1,425 hp., are rated 600 volts.

Westinghouse photos



Filaments Win Street Tests

LIGHTING men who heard A. F. Dickerson of General Electric Co. speak before various organizations throughout the West last year will recall his reference to tests then being got under way to compare the merits of incandescent and fluorescent for street lighting. Three comparative tests have been run to date with the conclusion: Fluorescent street lighting, using lamps and luminaires available today, is at a considerable economic disadvantage in comparison with filament-lamp lighting.

The statement was given out by Kirk M. Reid, General Electric street lighting specialist, who is chairman of the IES Research Subcommittee on Street and Highway Lighting, and was based on tests sponsored by the subcommittee at Cleveland, Detroit and Schenectady.

Tests consisted of mounting the two kinds of units in proximity on test sections of standard streets and highways, burning them alternately, and comparing the results with a G-E street lighting evaluator.

Optically simple 2-lamp luminaires were employed for mounting the 100-watt white fluorescent lamps, which were compared with 6,000-lumen series filament lamps in three modern types of luminaires. In two tests the fluorescents were mounted at 45°, and in the third they were mounted horizontally.

Comparison of the accompanying photographs gives an approximate indication of the results. Fluorescent units demonstrated the advantages of high efficiency of light generation, low brightness, relatively long life and enhanced visibility on wet pavements because the elongated source produced broad streaks of brightness. Outweighing these, however, were the disadvantages of low light output per foot of source, large size of luminaire required, and the necessity for jacketing in cold weather.

Now for Farm Wiring

Companion piece to the residential wiring design book (reviewed last month) is the *Handbook of Farmstead Wiring Design*, both being the handywork of the Industry Committee on Interior Wiring Design.

Farm wiring runs into more varied considerations than the wiring of a home, but the committee has managed

to handle these both comprehensively and clearly. Various types of farm structures are taken up one by one and treated by means of diagrams as are the rooms of a house in the other book. Or when a particular farm is under consideration one can turn, for example, to "Fruit and Vegetable Crops," look under the subheading on storage, find the sub-subheading on lighting outlets, and find the recommendation: "One for every 20 linear feet of alley, wall switch controlled."

Equally useful is the second part of the book, dealing with distribution. It includes sections on planning the distribution system, pole metering, outdoor metering, indoor metering, exterior lighting, and tables and data on demands, wire size and voltage drop.

For information on prices and ordering see ELECTRICAL WEST for May.

Code Changes Coded

The kind of guide which should be got out, but rarely is, when rules are changed has been published by Anaconda Wire & Cable Co., under the title, *The Story of 1946 Code Changes.* Included are not only the new data but also a summary of what the changes are and some examples of what they mean in comparison with the old code—the stuff one usually has to figure out for himself on the back of an old envelope.

All this dope is condensed into a handy little pocket-size folder 4 in. wide and 9 in. high. Anaconda (address 25 Broadway, N. Y. 4, N. Y.) advises they will send copies to any inquirer who writes mentioning ELECTRICAL WEST.

SCHOOL KEEPS UP--GETS 55 FT.-CANDLES

HOW fast appreciation of good lighting is growing, as well as the fact that better lighting is the best salesman for better lighting are demonstrated at Ross Elementary School, at Ross, Calif., where a second relighting job has just been initiated, replacing one thought to be considerably advanced only a few years back.

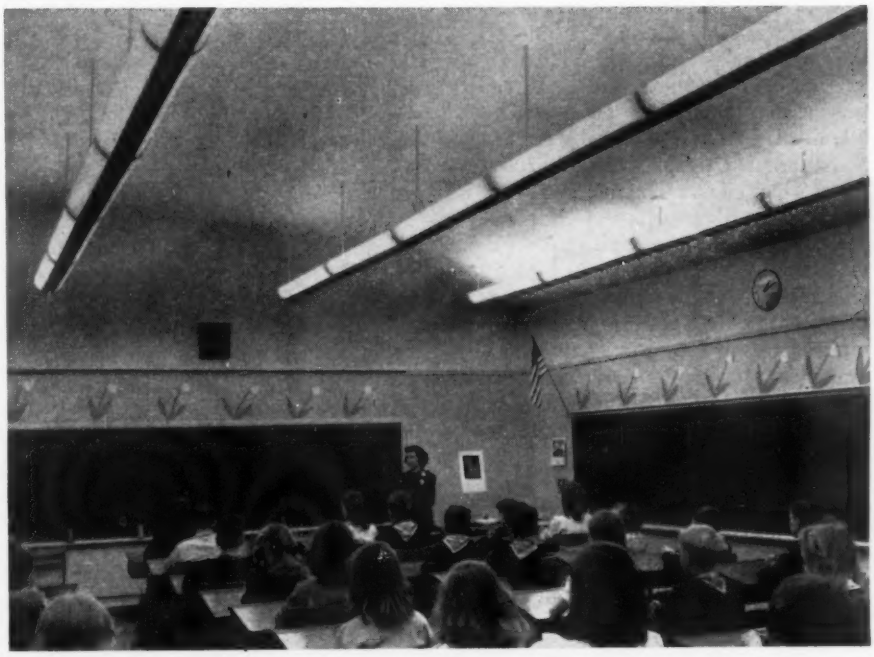
Service amounting to more than 800 hours at the time of writing has already been chalked up on one room, where the new fluorescent units are providing 55-ft. candles on the desks. Three more rooms are to be done.

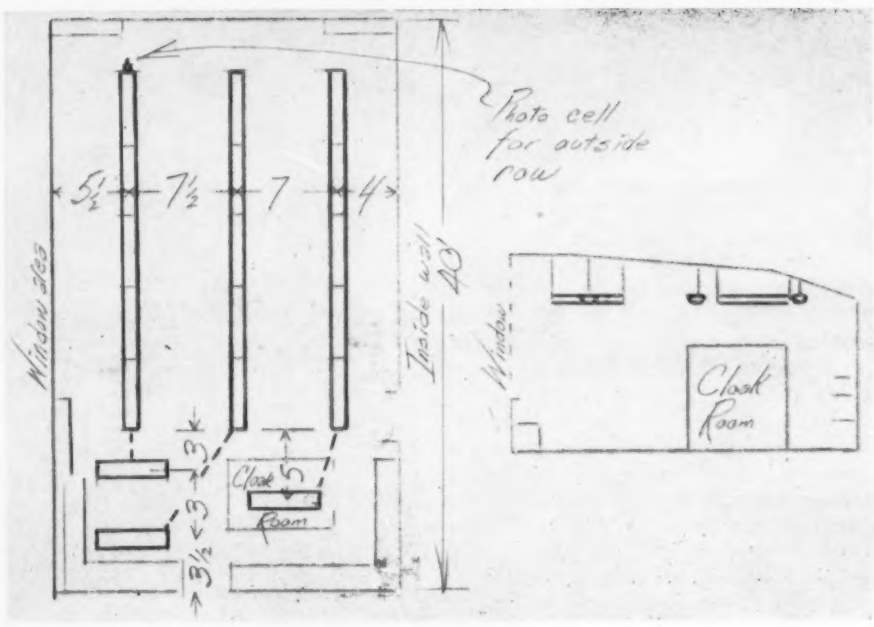
The re-relighted room measures 24x40 ft., has some departures from standard for school rooms, including a sloping ceiling and a cloak room which is a room within a room. Gilbert Trosper of Pacific Gas and Electric Co. worked out the design, which consists of three rows of 60-in., 2-lamp, semi-indirect Guth-Cadet units. Lamps are 100-watt white fluorescent.

There are six units per row, five being continuous and the sixth separate. The three separated units provide illumination for the complex room arrangement indicated in the illustrations. Units are 10 ft. above the floor. Each row is switched separately. The window row is to be photo-cell controlled when equipment is available, responding to failing daylight.

Walls are light blue-gray, and the ceiling, which slopes from 12 ft. by the windows to 10 ft. on the opposite side, is a lighter tint as are the upper side walls. Metal venetian blinds and light shades control daylight. Previously, the room was provided with six 500-watt totally indirect incandescent units.

Responsible for getting the job in and supervising the design was Jim Barnes, Pacific Gas and Electric Co., San Rafael. Installation was by Tamalpais Electric Co., San Anselmo.





SO YOU WANT US TO SELL RANGES--

Says this salesman who, though real, must remain under wraps

"LO THE multitudes labored long and diligently, and brought forth a mustard seed." That is not a quotation from the Bible. It sums up to me, a salesman, the so-called "postwar" planning of the electrical industry; power company executives, you alone know whether your company wasted valuable manpower on such planning, whether you were ready for VJ day or not.

I am frankly an ex-electrical range salesman. For years I would rather miss a sale than sell a gas stove. I was a believer, and through good times and bad managed to make from $2,400 to $4,800 per year. During a streak of "buyers' market" years I worked on a small commission and salary. Then when the lean years came along I would be placed upon a substantial drawing account against a larger commission. By juggling my pay that way, the industry kept me working hard whichever way the wind blew.

But now times have changed; again a buyers' market. I work for a large concern in the metropolitan area of southern California. We carry both gas and electric ranges. When a customer comes in to buy a range, I can price him the gas and write the order and grab me another customer.

In other words, my time is valuable to me, if a customer insists on an electric range, woe is me, I'm in for a two-day deal . . . Where do you live? Served by Edison? City of Los Angeles? City of Burbank? City of Glendale? Is your house wired? (Have had people sign up for a range and assure me that the plug was right in the wall behind the range, only to find out that the plug they referred to was for a light or clock on a gas stove.)

After getting this information I call the power company for their policy on range wiring. Then I am faced with getting an estimate from an electrician on the job. (Brother! Have you seen some of these estimates lately?)

Again I repeat, my time is valuable, the small commission I get during a "buyers' market" makes me wonder if, during all this time of postwar planning, something could not have been worked out to price the range, as you price all other appliances, automobiles, etc., so much money, ready to go.

Until power companies do as some power companies in the East are doing, running the service meter loop, switches and fuse blocks and carrying them as their property and as capital investment and allowing wiremen through local code revision to run to the range in weather and water proof, three-conductor cable, wiring costs are going to stay prohibitive.

So, as one appliance salesman to the industry, until something is done about this, and you electrical fellows take some lessons from the American Gas Assn., and their type of advertising, I'll be selling the article that I can sell the quickest and easiest. I know that just one salesman telling you that won't scare the great big electrical industry. You'll sell ranges, but how many more could you sell if the industry sold electric cookery instead of each manufacturer trying to confuse the customer as to make to buy, and if they were priced installed.

The atomic bomb age is an age of reality. Salesmen think in terms of dollars and *now*. They no longer are interested in the long haul and missionary work or in doing the power companies' load building on a commission basis. Gentlemen, the next move is yours.

[Editor's Note—These are the days when the help talk back to the boss. Instead of being a labor "gripe", however, this challenge from a good appliance salesman faced with today's conditions is one for the entire industry, not his boss alone. As he says, he will sell what makes him the money. So will his dealer boss. The electric range still has a big handicap on it in competition with its competitive fuel ranges, because of wiring installation and the complications surrounding it.

To answer this salesman and many others with the same question, a really determined effort IS being made in southern California by the PCEA range committee and the utilities, both municipal and business owned, to arrive at (1) a uniform simplified installation acceptable to all municipal inspection departments, (2) a standard average price of installation on a mass production basis by (3) a few electrical contractors who will specialize in this work, so that (4) a standard installed price can be quoted on each range sold.

Just as the manufacturer, distributor and dealer each demand of OPA a price that makes it profitable to be in business in these trying times, so, too, the dealer's salesman must find it profitable to exert the effort, take the training and handle the detail that goes with a sale. That is all part of the enterprise system. And the same goes for the contractor who makes the wiring installation. It is a real job of coordination for the electrical industry.]

They put on a good show, the Frigidaire crowd, and although there has not been a big Frigidaire road show since the war, some 300 key district personnel were called in to Dayton for a brush up sales management training program and F. W. Beecher, appliance sales manager for the Pacific Coast regional office, again showed his dramatic talent by staging a cooking demonstration de luxe

ELECTRICAL WEST Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © JUNE, 1946

What We Can Do

By Arnold E. Kuhnhausen

President, Northwest Appliance Retailers Assn., Portland, Ore., before NWEL&PA Meeting

ORIGINALLY I entered the electric appliance business years ago because I saw a certain amount of romanticism in it. I considered the electric appliance business as a dignified endeavor and I still maintain that it should be kept on a high plane. The only reason for the existence of any business is to serve human needs and to serve them well. The Northwest Appliance Retailers Assn. has based its central theme on these primary statements. Summing it up, it really means fairness to all concerned.

As we glance in the looking glass in the past 25 years, we see a constant increase in the evils and ills creeping into this dignified business. It is this that our association has in mind to curb. We do not mean that, by becoming acquainted with one another and knowing each other, we will all start to sprout wings, but we believe we can dwarf the horns.

We in the Retailers association cannot see any fairness in farmer Jones buying an appliance and paying the regular franchised established price and mill hand Smith doing likewise, and street cleaner White the same, but President "Gotrocks" of a big industrial plant or bank, or someone else who is secretary or manager, or because he belongs to some church or society, or because he has a nephew whose father is a friend of some retailer, jobber, utility or manufacturer, expecting his friend to get him a price. That simply is not fair.

They may want three times what it is worth

Nor do we believe that it is fair to sell an appliance to Mr. Brown, who has a trade-in, and make an allowance for more than the actual value. If a retailer allows more than actual value for a trade-in, he might be considered dishonest if he attempts to sell it to someone else for more than it is worth. Nor do we think it is fair to make a trade-in allowance on the purchase of a new appliance to one person, and go across the street and allow more for a trade of equal value, because we, the retailers, have made chiselers out of the consuming public and taught them to want two or three times as much as the used appliance is worth.

It is our belief that, when we look at this problem right and act accordingly, we approach the beginning of wisdom. It cannot be considered anything else but good

—yet be surprised at new model prices

ethics and honest dealings with the public. Nor do we believe that it is fair for a jobber or manufacturer to sell through his back door.

I remember only too well when the jobber and manufacturer came to me and other old retailers and said, "You are the salt of the earth, you are our bread and butter, you are simply wonderful." At that time, we took those words at face value, but we could not always depend upon their validity in future relationships.

What we want the jobber and manufacturer to do now is to make good their promises. We have kept up our part and we believe they will theirs. We are no longer children in the appliance business —we are actual retailers. We do not ask for any more paternalistic advice. We want to cooperate on a fair basis with all concerned. What we now ask is that those glowing promises that were made when we were referred to as "the salt of the earth," be kept. That is fair enough, isn't it.? That's the contract we all signed.

If all of the retailers have a code of ethics based upon a simple philosophy of fairness to all concerned, we will discover that fairness to all means to live and let live. Is there anything wrong with this?

We retailers are not concerned whether it is true or false that a rate stricture is equal to a kilawiggle with certain allowances made for load fractures. Nor are we concerned whether the theory for alternating current follows the law of the trigonometric function of the sine or cosine. That is simply a problem of the engineering department of the utilities.

Nor are we going to interest people in buying appliances, and tell them that we are going to build them a house at wholesale. We leave the house building to the contractors and builders.

We are indeed appreciative that the Home Builders Assn. has voluntarily and in straightforward manner declared that quality products should go into new homes, and that they should be secured from the retailers, who can render a real service and at the same time assist the builder by keeping the purchaser happy.

We also know what a play the prefabricated manufacturers have made to get us into the building business but at the moment we are not interested. Nor are we going to interest people in buying an appliance, and promise them that we will secure an apartment in an apartment house at wholesale. That belongs to the apartment house owners. We also have taxes to pay, don't we?

Well, we are watching very closely the non-taxed co-ops. We know how they have spread in the Middle West, eastern Oregon and Washington and are now at our doorstep. We cannot stop their aggression, but we can watch who supplies their appliances and who manufactures them—that is, if they are able to get them at all in our region.

In 1929 to 1933, I had a salesman who could sell more appliances than any two or three other salesmen. He came to me one day and said, "I have found a place where I can buy gasoline at 6c per gallon less. I have found another place where I can buy my tires at wholesale, and I have found still another place where I can buy my groceries at wholesale. I'll be glad to take you over and introduce you to them."

"No, thank you," I said. "How can you expect these dealers in gasoline, tires and groceries to buy an appliance from you if they make no profit on what we buy from them. How can they employ and pay decent wages to people who, in turn, can either purchase our appliances or buy something else. You think these retailers did you a favor. Suppose they come to you and ask for a reduction, what are you going to say? Suppose we stoop to cutting the price and, because of having no net

income, either have to put you out of your job or let someone else go? Do you think that would gain anybody anything?" The answer is obvious.

And so it is with this whole Appliance Retailers Assn. as well as the utilities, the jobbers and manufacturers, the home builders and apartment house managers. When we speak of prices, we speak of the franchised suggested price.

Let me give you in conclusion what one of the greatest Supreme Court justices said about this question of price. Justice Holmes, in the case of Dr. Miles Medical Co. vs. John D. Park & Sons, said:

"1. The most enlightened judicial policy is to let the people manage their own business in their own way, unless the ground for interference is very clear.

2. "We greatly exaggerate the value and importance to the public of competition in the production of an article as fixing a fair price. What really fixes that is the competition of conflicting desires.

"3. I cannot believe that in the long run the public will profit by this court permitting knaves to cut reasonable prices for some ulterior purpose of their own and thus to impair, if not destroy, the production and sale of articles which it is assumed to be desirable that the public should be able to get."

You have the decision of one who was perhaps the greatest Supreme Court justice of all times. His honesty and fairness is unimpeachable. Private enterprise is at the cross roads. Let appliance retailers, jobbers, manufacturers, contractors, apartment house owners and utilities all work together on a self-respecting basis so that we can keep the United States of America united, and the Dominion of Canada too.

Salesmen Seek to Please

Sixth of a Series of Good Sense Articles on Business Management

By Ken Hampton

THE merchant's contact with customers is through people, sales people. It is true that the attitude of the employee toward the public reflects the attitude of the management. In fact, employees generally express that attitude quite correctly.

This is probably truer in a medium-sized or larger organization than is generally believed. Yet in an organization where the employee and boss work side by side, the worker knows the boss and has a better chance to reflect his policies.

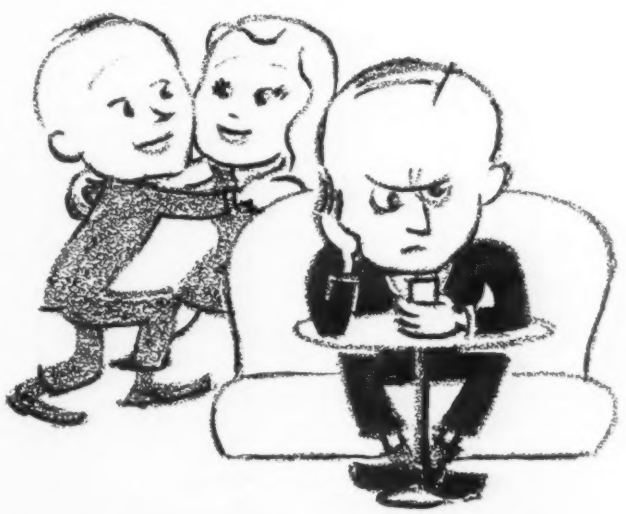
In larger organizations rules must be formulated and policies laid down. In spite of the utmost care with which these are made, they are subject to the ability of representatives of management to make work.

The priceless spirit of being made to feel important in one's job has often worked wonders with organization efficiency when all other means have failed. Everyone wants to believe that what he is doing is worth while; that it is important his task be accomplished. The man who can instill this feeling of importance in others produces wonders. He not only gets more work done, but he has happy workers, no labor problems and feels good inside himself.

Since pleasing people consists of doing more of the things people like and less of the things they don't like, let's see what people like about sales people.

Important in pleasing people is appearance. Window dressing is an important part of life. Just as a merchant dresses up his windows to make you desire to purchase his products, so you as a salesman should "dress up" yourself. Dress up your

What kind of a mixer are you?



voice so that it is agreeable, your hair so that it is neat and your hands so that they are clean. Above all, learn to smile. Some points on which a customer judges are:

1. Does he look straight at me when he greets me? I want to be greeted as if I were somebody, not treated in an impersonal, offhand way.
2. Does his general appearance impress me favorably? I want to do business with an intelligent, responsible person.
3. Has he a pleasant voice? If he has, I'll spend more time talking with him.
4. Is he a good listener? I want to buy just the right thing and I don't want some salesman trying to sell me something before he knows what I need.
5. Is he sincere? If he is earnest and serious, I'll believe what he tells me.
6. Is he self-confident? If he is, he must know his business. These salesmen who are nervous and ill at ease make me wary.
7. Does he give his whole attention to me and my problem? If he does, I'll like him, his store and the merchandise he sells. I guess if I'm going to spend my hard-earned money I deserve a little attention.

Whiling away the time with prospects isn't selling—it's visiting and, if done at all, should be done after the purchase has been completed. No salesman was ever injured or lost his life as a result of asking a customer for an order. The customer should receive a friendly greeting, be given a chance to express his need, asked to buy.

Organization merchandising efficiency is directly dependent upon sales training. Usually this is done best by inspiring employees to improve themselves and develop their own abilities to sell by pleasing.

Here is a check list for salesmen:

1. Are you selfish? Selfish people are not well liked. This will show up in:
   a. Are you more anxious about the reward for the job than in getting the customer served and your work well done?
   b. Are you stingy? This means you are willing to take without giving in return. A salesman serves best by forgetting himself and giving time and attention enthusiastically to his customers.
2. Are you self-centered? If you are, people don't like to trade with you. This will show up in:
   a. Lack of interest in the other fellow.
   b. Intolerance of others' opinions. A salesman never contradicts people.
   c. Being overcritical of people. A successful salesman likes all people.
   d. Overlooking the good in people and seeing only their faults.
3. What kind of a mixer with other people and in crowds are you?
   a. Poor? If you are, learn to smile and be more friendly.
   b. Are you too much of a good fellow regardless of consequences? If you are, you are probably entertaining yourself and becoming a nuisance.
4. Are you reliable? Customers want to trade with responsible people.
   a. Do you often pass the blame for mistakes on to other people?
   b. Do you stand on your convictions quietly but solidly, or are you a moral coward?
   c. Are you mentally insincere? Do you try to just get by?
5. Are you a worrier? A worrier does not express confidence.
   a. Are you easily discouraged?
   a. Are you given to self-pity?
   c. Do you worry about what would happen IF?
6. Do you have a definite, worthwhile purpose and are you doing your best to attain it? If you are, you will be successful, and customers like to trade with successful people.
7. Have you a definite faith in your own ability and the worthwhileness of life? If you have, you will win confidence.
8. Are you loyal to your employer? Loyalty helps inspire confidence in others.
9. Do you encourage others and express generous impulses? If you do, people will like you.
10. Can you and do you control your temper? You had better, because it is essential that you be pleasant in order to please others.
11. Are you a builder instead of one who tears down? The rewards go to builders and those who tear down only undo what others have built.

It takes faith, vision and courage to build a successful merchandising business. The business must operate around and through people who serve other people. The business can only grow and prosper by pleasing customers well enough so that they will return again and again to purchase the products the store sells. Even the Supreme Court recognizes this because it defines good will as "the disposition of a customer to return to a place where he is well served."

Entertaining yourself?

Successor to H. A. West Co., active merchandisers of electric appliances in Portland for years is Harold Kelley's Appliance Center, which managed a respectable display of wares during war scarcities and plans intense field selling

In Portland

An association of appliance retailers that has been shaping up for the last three or four months in Portland, has recently jelled with the adoption of by-laws and a "Creed" for doing business, and with election of a board of trustees and officers and a managing director. Northwest Appliance Retailers Assn. is the name adopted, and the territory embraces the distribution area covered from the city of Portland, meaning practically all of Oregon and the southern counties in Washington.

Arnold Kuhnhausen, veteran appliance dealer of Portland, has been named president. Other officers are: H. P. Kelley, Kelley's Appliance Center, vice-president; Homer Calef, Calef Furniture Co., treasurer. Chosen by the board to be managing director is R. C. Brummer, formerly Northwest manager of EHFA. Offices have been established in the Multnomah Hotel Bldg., 123 S. W. Third Ave., Portland.

Additional members of the board of trustees are: K. L. Mendenhall, Hawthorne Hardware Co.; Vern L. Wenger, Vern L. Wenger Co.; W. W. Davis, Eastern Outfitting Co.; W. L. Pengelly, Lipman Wolfe Co.; J. Woodle, Sears Roebuck & Co.; and Charles Snell, Meier & Frank Co.

Officers of the Northwest Appliance Retailers Assn.: Arnold Kuhnhausen, president, H. P. Kelley, vice-president, and Homer Calef, treasurer of organization

Celebrating 71 years of selling, Argumento "Dad" Thurlow of Powers Furniture Co., Portland, was honored by the Portland Retail Trade Bureau recently. Next to Thurlow is Neil Eggan, vice-president of Powers; George Walker, secretary-treasurer, and Ed Casey (at right), president. Ed Weinbaum, manager of bureau, shaking "Dad's" hand

ELECTRICAL WEST

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Study in Human Relations

THERE is a certain amount of encouragement in the announcement that the University of California is about to offer courses in human relations. It would be a fine thing if a lot of people ranging from politicians and labor leaders to management officers and publicists could take post graduate work in the new courses. One splendid result might be a new understanding which would eliminate much present-day confusion and strife. Management men might profitably learn why workers look to outside agencies instead of to business and industry for guidance and help. They might learn why the worker turns to government for social security, to unions for wage increases and to various governmental agencies for answers to broad economic problems. After taking such a course labor leaders ought to comprehend some of the factors which make the interests of the worker and of management parallel, instead of absolutely divergent, as they are made to appear now. Politicians might be taught some of the virtues of saying what they mean and meaning what they say.

Maybe we are talking about the millenium. It might appear so in the light of the multitude of strikes; both direct and primary, which have the entire electrical industry just about stalled.

The Reconversion of Joe

IN the term reconversion, when applied to the returning veteran, may often be detected the same pattern of thinking which sees the solution of national troubles as a return to conditions of the 1920's, or some other era which in memory at least seems less formidable than the present. Most of us have got used to the fact that times change—something we had little need to notice when times were not changing so fast. Most of us have accepted the fact that no past situation can be perfectly reconstructed. Good use may be found for lessons from the past, but they will lead to a situation which is new.

The World War II veteran who is again a civilian is likewise something new. A personality is at least as dynamic as a nation. It is also less obvious. At the superficial level where most human contact goes forward Joe may appear to be his old self. That Joe could not possibly be his old self, can never be his old self, and probably has no wish to be his old self, are seldom seen.

That Joe appears to be his old self is probably because he finds that appearing that way is the simplest thing to do.

A few non-veterans have the wisdom to recognize this simple fact and the instinct, when dealing with veterans, to avoid those grounds where understanding will be lost. They are very few. The rest blunder along, riding rough-shod over attitudes which are sensitive and real.

The point is that while a few can recognize, they must then avoid; none have the background for solid understanding on all ground.

At least one business executive has seen this situation clearly. He requires that all returning veterans, as well as veterans applying for jobs, be interviewed by a member of the organization who is himself a veteran.

The policy has as much usefulness now as at any time since V-J day. For there is no law which says an employer may speak personally to a man only on the day he comes to work.

Looking Down a Gun Barrel

BY a peculiar quirk of law and tax levying power companies in the state of Washington have been contributing over the years to funds which might ultimately be used to put them out of business. The Washington PUD law allows those governmental agencies to levy taxes not exceeding two mills upon all assessed property in the country or district. Some 16 PUDs (only six are actually operating electrical systems) have collected a total of $2,223,757 in taxes from the time they were organized through 1945. The 1946 levy will add another $329,052 to this total.

Paradoxically the operating power companies in the tax-levying districts have contributed $132,450 to the total. This is like supplying ammunition for the gun of the gangster who is about to shoot you.

As a matter of fact, the tax collecting proclivities of the operating PUDs have developed a real source of revenue—hidden, of course, from the public in most instances. Some districts frankly admit that the tax levies permit them to sell electricity at lower costs. Others use the money to defray operating expenses and boast about their so-called profits.

Somehow or other the whole procedure appears cockeyed. The operating districts, in the minds of most students of government, ought to be paying taxes instead of collecting them. The non-operating districts do not need any funds.

Why Are Associations?

THERE are two ways in which men can be banded together to accomplish a purpose. One is regimented mobilization under duress. The other is voluntary, as an association. It is significant that on the whole the association that has a fine, constructive purpose finds duress or pressure unnecessary to build its ranks. It *attracts* rather than *forces*. And its works live longer in human history.

The banding of mankind under pressure or fear or coercion may bring temporary success, but it contains the germs of its own destruction. Whether it be a union that forces membership on everyone, a business men's association that employs pressure tactics to force membership and compliance, a political party that must enforce harsh discipline in order to keep its members under the spell of fear, that band is doomed eventually to die of its own internal poison. It has been so since the beginning of time.

Contrast this with the fine accomplishments of many unselfish and constructive associations. They band together to make things better, to improve and stimulate growth, develop both the individual member and the group as a whole. They are of benefit to mankind. May there be more of this kind of healthy, unselfish and constructive grouping. May some of the other type see the light and change their course into that light.

A Cheerful Earful

BY nature the business man is an optimist. If he succeeds, it is because he launches his enterprise with faith in the future, confidence in his own ability, and a cheerful view of life and its obstacles. There is zest in his enterprise and cheer in his heart. He delights in the freedom to be on his own. So it is natural to expect optimism from business men.

Of late, however, the business man who is cheerful is rare. He has been turned into a gripe by everything in his environment. There is no merchandise or material. Labor is both lazy and troublesome. Every service he uses may be cut off by strikes—transportation, telephones, utilities, raw materials, component parts. No sooner is one stoppage ended than one or two others begin. Nothing can be counted upon any more, except interference. At every turn he runs into arbitrary restrictions. If it isn't a bureaucrat it's a union rule or an antique code. No wonder the business man has become psychopathic. He's in far worse than a rat maze.

To one of dynamic nature these pessimistic attitudes are unbecoming and foreign. When there is so much to do and the business man, if left alone to express himself normally, would be busy making this a more comfortable, if not a better, world to live in, his energies are absolutely wasted.

When this was a great commercial nation, as it could easily be again, it was the happiest in the world. Nobody felt any class consciousness. Everyone had an optimistic view of the future, a feeling of freedom to go places and do things. If one were at the foot of the ladder, at least there was a ladder and it was up to him to climb it.

The "sad, fierce thinkers," in trying to lift up those unfortunates at the very bottom by nonexistant bootstraps, have only succeeded in making everyone as sad and fierce as they, and not in spreading either more abundant or more cheerful life. Surely the American public will brush aside these doleful regimenters and give the cheerful business man a chance to make them happy again with new appliances, new lighting, new kitchens and, best of all, new hope and new freedom.

WHETHER leadership resides in a man, an industry or a manufactured product, emulation and envy are ever at work and in all worthy undertakings the reward and the penalty are ever the same. The reward is widespread recognition, the penalty belittlement. When an industry's work becomes a standard for the whole world, it also becomes the target for displacement. If its work is merely mediocre, it will be left severely alone. There is nothing new in this—it is as old as the world and as ancient as human nature itself. If an industry truly leads, it remains—the pattern.—L. K. Sillcox, first vice-president, New York Air Brake Company.

Inspector Plans for Annual Meetings

Advance plans are being made by both the Northwestern and the Southwestern sections of the International Association of Electrical Inspectors for the annual meetings this fall.

The Northwestern meeting will be held at Hotel Boise, Boise, Idaho, for the first time that a meeting has ever been held in Idaho. J. Carl Baldridge, Idaho Power Co., has been appointed local chairman by President C. S. Alger of Seattle. On his committee are William Hopper, in charge of finances; Carl Young, program; Ken Jones, publicity; Park Forte, banquet; D. Board, hotel and reception; Andy Anderson, registration; Fred Varney, trips, and Mrs. Hopper and Mrs. Forte, ladies committee. Dates are Sept. 23-25.

The Southwestern Section will hold its annual meeting at Hotel Sacramento, in Sacramento, Sept. 30-Oct. 2. If by that time the river boats have resumed their runs between San Francisco and Sacramento, a boat ride may be combined with the Sacramento meeting. Instead of a banquet, the Sacramento committee, headed by Clifford Prudhomme, has planned a trip to the Mother Lode mining region, to visit the old pioneer towns of Placerville, Jackson, etc., and there an open air "miners stew" dinner will be served.

Neither President M. C. Sandles, nor prospective IAEI President Ben Hill, both of Oakland, were able to find a place in the East Bay which could take care of the annual meeting.

Programs of both section meetings will be devoted largely to reviewing and getting acquainted with the changes to be found in the 1946 edition of the National Electrical Code. Secretary Harold Gerber, in charge of the program for the Southwestern Section, plans to have a talk on the rupturing and cascading effects of air circuit breakers, and another on load limiting devices on net work systems and similar pertinent topics. There will be the customary code breakfasts at which inspectors get into their own code and administrative problems.

Both northern California and southern California chapters of the Southwest Section IAEI have held two meetings recently, one last month in San Jose and Long Beach respectively. The San Jose meeting drew an attendance of about 100 and spent the evening discussing code changes. R. B. Maxwell, city electrician, San Jose, was host and chairman of the meeting. The next meeting of the northern California group is to be in Oakland. The previous meeting was held in San Francisco. George Kimball, a member of the Electrical Committee, gave a preliminary outline of some of the code changes.

The Southern California Chapter met May 22 at Long Beach. Topics of discussion have not yet been reported. At the previous meeting at Beverly Hills, among the variety of subjects covered was the experience Los Angeles city inspectors are having in enforcing the unsafe appliance sales control ordinance these days with the influx of new and untested gadgets and appliances. The next meeting is to be held in Santa Monica, July 31.

● Earl Jarvis, B. C. Electric Railway Co., was guest speaker at the meeting of the Vancouver Electrical Assn. on April 17. His subject was adequate wiring and his address was supplemented by the presentation of the film, *Dawn of a New Living*, produced by Walt Disney for Westinghouse. The meeting was the last of a series of educational sessions arranged during the winter by the association in connection with the Electric Service League of British Columbia. Meetings were under the direction of the educational committee, of which L. Sewell is chairman.

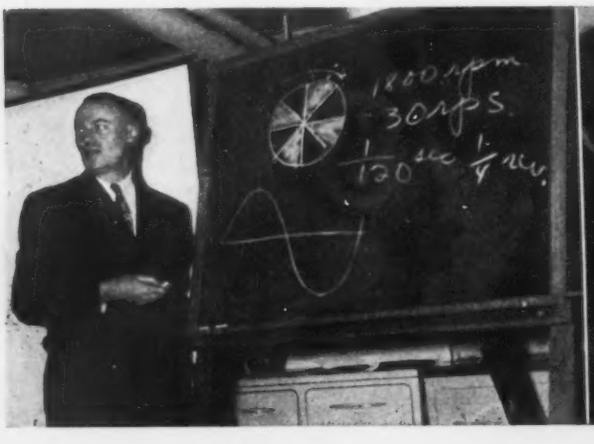
Appoint Advisors

Five members of the Electric Club of Washington, including President O. A. Alderman, have been asked to serve on an advisory board recently organized by the electrical inspection division of the Division of Safety, Department of Labor and Industries, at Olympia, Wash. The advisory board includes representatives of utility companies, electrical contractors, labor, manufacturers, education, grange, inspection groups, and Underwriters' Laboratories. The board, selected by Thomas L. Matney, state chief electrical inspector, will meet every three months, and will discuss such matters as changes in codes, sale and distribution of sub-standard electrical materials, and like subjects.

Electric Club members, aside from President Alderman, include: Frank Holert, Holert Electric Services, contractors; William Gaunt, business manager and financial secretary of Local 46, IBEW labor; Clere Alger, Puget Sound Power & Light Co., utilities; Ray Larabee, Underwriters' Laboratories.

● Bay Cities Chapter of National Industrial Service Assn., the motor dealers organization, elected Clarence Lindstrom, Weidenthal Glosiner Co., San Francisco, as its chairman; William Bassett, Concord Electric Co., Oakland, vice-chairman, and Keith M. Noble, Pacific Electric Motor Co., Oakland, secretary-treasurer, at its annual meeting recently.

Dr. E. W. Schilling, engineering dean of Montana State, telling the effect of strobe to Montana inspectors last month



Dan Goggins, center, Great Falls contractor, heading inspectors committee to initiate state wiring inspection

★ ★ ★ ★ ★

"U. N." Electrically Speaking!

The important job of the United Nations world organization is to solve mutual problems confronting various members, to serve as a clearing house for the exchange of ideas that will help all nations.

Within the western electrical industry, we, too, have a "U.N."— the Pacific Coast Electrical Association. Here is a medium for solving mutual difficulties which confront various segments of the industry. Here is a vehicle for meeting the fundamental problem of getting the wheels of peacetime industry to turn at ever increasing speed.

Your Association now has 2364 members, an increase of 14¼% over 1945, real evidence of the growing realization that a united industry can face the problems of peace with prospects for each individual in it.

If you have a friend who is not now a member, invite him to join with industry's leaders in the electrical industry's "U.N. "— the PCEA.

PACIFIC COAST ELECTRICAL ASSOCIATION, INC.

601 West Fifth Street
Los Angeles, 13

447 Sutter Street
San Francisco, 8

★ ★ ★ ★ ★

Denver IES Hears Germicidal Data

Germicidal lamps, their virtues and their limitations, were explained in adequate and yet simplified terms by Brooks Chassaing, Art Metal Co., Chicago, at the as yet unreported April meeting of the Rocky Mountain Chapter, Illuminating Engineering Society, Denver. He made important points in cautioning engineers that, while there were similarities, there were even more important differences between ordinary illumination and germicidal radiant energy.

Ten per cent more light than estimated, for instance, can do no serious harm, but 10½ too much of a 2,537-au. light source can do much harm. Ninety per cent of a germicidal lamp's energy is at this wave length and there is some also at the wave length that produces ozone. Too high a concentration of ozone also is dangerous. "It is not a device to be used carelessly," a doctor had warned.

Chassaing stressed the need for an absolutely correct application if germicidal lamps are to be used at all. Exposure from too close a range will cause painful skin and eye burns. Too much reflected light can also prove harmful. Unfinished plaster, for instance, reflects too much of the ultraviolet. Metal does also. The fixture must be designed not to allow reflection but to irradiate a large volume of air.

Germicidal units should not be combined with lighting units. Each room should be studied as to its size, ceiling height, number of people in the room and approximate age of the occupants. Then the right design of fixture and the right number may be engineered to give desired results.

The wave lengths emitted do not destroy all germs, he explained. They do prevent some mold growths. What irradiation does is to provide in germicidal effect the equivalent of many changes of air per hour.

He emphasized the need for accurate radiation curves on each fixture and that each fixture should be tamperproof, and yet easily cleaned and relamped. For industrial purposes, many applications call for direct radiation on a product and in such cases require safeguards for employees working within range.

At the previous meeting Walter Potter, General Electrical Lamp Department, of Portland, presented a talk and demonstration of new light sources in speaking on *Light Designed for Seeing*. Howard Cummings, USBR, chairman of the chapter, presided.

Wakefield's Visit

Making a swing around the West to visit with and bring a message to the various chapters and sections of the Illuminating Engineering Society, Albert F. Wakefield, president of IES and of the F. W. Wakefield Brass Co. of Vermillion, Ohio, spoke before the B.C. Chapter in Vancouver, Washington State Chapter in Seattle, the Oregon Chapter at Portland, Northern California Section at San Francisco, Southern California Section, Los Angeles and Rocky Mountain Chapter, at Denver last month.

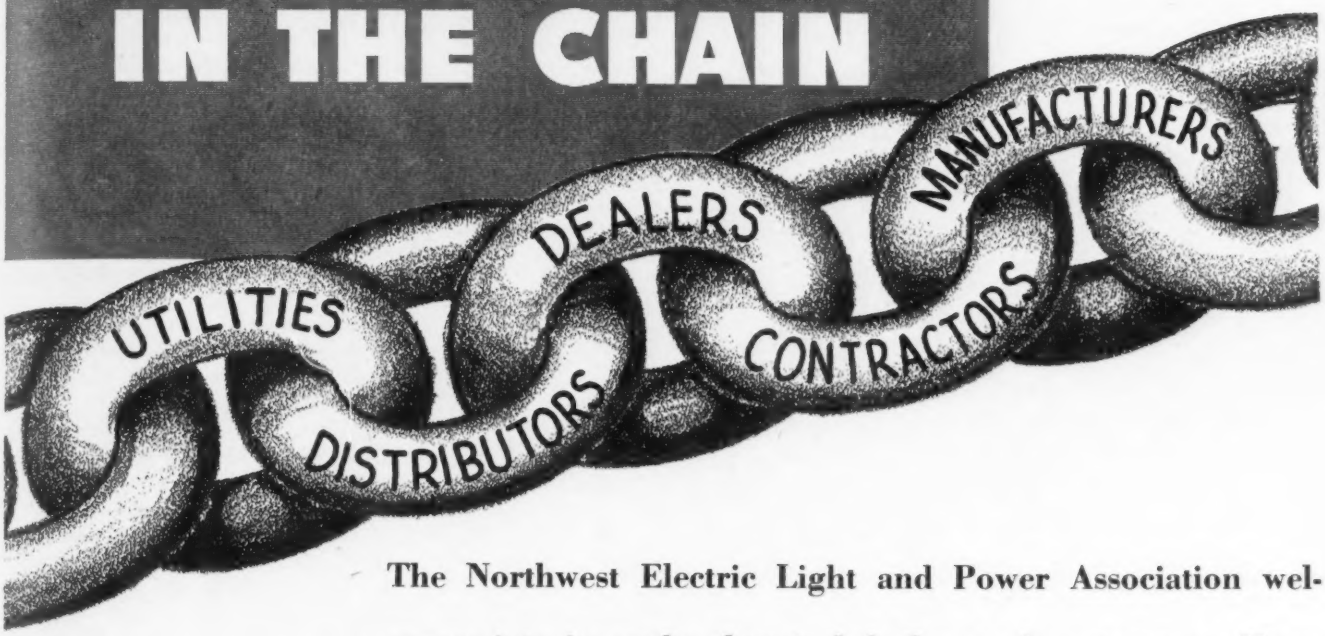
In each instance the membership made it a special "president's" meeting and heard Wakefield describe the activities and programs of the society. He spoke of the prestige which IES has gained by its scientific and factual studies, its carefully developed recommended practices, its research fund and the conscientious professional conduct of its members. He answered questions relative to IES policies and projects. In each city he met with the board of governors of the chapter or section to discuss details of the relationship between headquarters and the local organizations.

Chairman Howard Cummings, G-E's Joe Hannemann and Brooks Chassaing

A president in the hands of a couple of vices was Al Wakefield, center, IES national president, when garbed for crab ciopino by George Rankin, regional vice-president, left, and Dr. Leland H. Brown, vice-president elect, at Northern California Section IES governors meeting at San Francisco's Fisherman's Wharf

● The Northern California Electrical Bureau has announced the election of the following officers and directors at its recent annual meeting: President, Louis J. Breuner; vice-president, A. H. Meyer; treasurer, Frank K. Runyan; secretary, O. R. Doerr; chairman, executive committee, John S. C. Ross; directors, Fred S. Fenton, Easy Washer Corp.; A. H. Meyer, Leo J. Meyberg Co.; George Egleston, H. R. Basford Co.; R. E. Robertson, Frigidaire Corp.; B. W. Reynolds, General Electric Supply Corp.; J. Philip Carson, Graybar Electric Co.; C. R. Matthews, Westinghouse Electric Supply Co.; Ernest Danielson, The Remler Co.; A. E. Rowe, A. E. Rowe & Co. Inc.; Charles W. Goodwin, General Electric Supply Corp.; Allan Jones, General Electric Co.; Frank Bodine, Westinghouse Electric Corp.; F. C. Scharr, Bryant Electric Co.; I. W. Borda, The Okonite Co.; Walter Thompson, Westinghouse Electric Corp.; Fred Benz, U. S. Rubber Co.; Marvin Jankelson, Incandescent Supply Co.; Louis J. Breuner, John Breuner Co.; Fred H. Pelle, Wisnom Hardware Co.; Lyman W. Ling, Jackson Furniture Co.; Obert Pedersen, Pedersen Furniture Co.; S. W. Newman, Charles Brown & Sons; Marshal Hale Jr., Hale Bros.; D. J. Desmond, Sterling Furniture Co.; Lee Shirar, Shirar-Young Refrigeration Co.; George W. Abbett, Abbett Electric Co.; Roy M. Butcher; Lester Fisher, Breuner's, (Sacramento); Clyde L. Chamblin, California Electric Construction Co.; K. M. Ryals, Stone-Ryals Electric Co.; James Galvin, Galvin Bros.; Conn J. Franke, Conn J. Franke Electric Co.; J. D. O'Connor, Luppen & Hawley; P. M. Diederich, L. Lion & Sons; John Elwood, National Broadcasting Co.; George Tenney, McGraw-Hill Co., LeRoy Smith, California Retail Hardware Assn.; T. L. Rosenberg, Northern California Chapter, National Electrical Contractors Assn.; Ralph Wiley, Department of Electricity; George W. Fitch, Retail Furniture Assn., of California; R. E. Fisher, O. R. Doerr and John S. C. Ross, all of the Pacific Gas and Electric Co.; Frank K. Runyan, Western Merchandise Mart; H. H. Courtright, Valley Electrical Supply Co. The following are Section Advisory Committee Chairmen: B. W. Reynolds, appliances; Fred Benz, wiring; A. E. Rowe, radio; Walter Thompson, lighting; George Tenney, education.

NOT A WEAK LINK IN THE CHAIN



The Northwest Electric Light and Power Association welcomes into its ranks electrical dealers and contractors. Here, at last, is an all-industry group—welded together for better understanding and constructive progress. Here is a common meeting ground for all segments of the industry . . . without in any way usurping the prerogatives of individual organizations. A warm invitation is extended to additional dealers and contractors to join with their associates and the utilities, manufacturers and distributors. Now, we can confidently say that there is "not a weak link in the chain" with all of us pulling together for more appliance sales—more "Adequate Wiring" and increased power usage.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

418 SPALDING BLDG. PORTLAND 4, OREGON

NECA Changes and News in the West

While the electrical contractors of Alameda and Contra Costa counties moved toward a strengthening of their organization by becoming a section of the Northern California Chapter of National Electrical Contractors Assn., their neighbors across the bay, the San Francisco Electrical Contractors Assn., voted itself out of being a chapter of NECA in balloting on 25 changes to its by-laws instituted by the new administration under Tom Harris, president.

The San Francisco association elected Harris and a new board of directors at the annual meeting in January in protest against the NECA pension plan. The voted change in by-laws leaves many staunch supporters of NECA in the position of having either to form a new chapter of their own in competition with the association, of forming a section of the Northern California Chapter, which they recently separated from to make a San Francisco chapter, or of remaining individual members of NECA.

Meanwhile the Northern California Chapter moved its headquarters to 608 16th St., Oakland, the former office of the Alameda-Contra Costa County Electrical Assn., which suspended operations to consider merging with the chapter. Ray V. Carey, former personnel man for some large war industries, was engaged as manager of the Northern California Chapter. Al Martin, NECA field representative, held meetings in Bakersfield, Eureka and Richmond with the northern California members preliminary to organizing local sections of the chapter there.

Martin also met with the Los Angeles and San Diego chapters of NECA last month and went to Las Vegas, Nevada, to confer with contractors there about formation of a chapter. He then visited Salt Lake City. Since becoming NECA field representative he has met with Seattle, Spokane, Sacramento and Portland chapters as well.

Carey says he has hopes that there will soon be sections of the Northern California Chapter in Oakland, Richmond, San Jose, Salinas, Eureka and Vallejo, Fresno and Bakersfield. Martin expects to make his headquarters at the Northern California office as a central point for the entire West.

● Peninsula Electrical Contractors Assn., of which William Klose, Klose Electrical Co., San Carlos, is president, held a banquet at Villa Chartier, San Mateo, May 8. Joseph Dingman, treasurer, and Seth Cohn, Atlas Electric Co., San Mateo, chairman of the arrangements committee, as well as W. J. Varley, secretary-manaber, were instrumental in the industry get-together which this new and fast growing contractors organization staged.

● Dates and Location of the NECA convention have been changed. The National Electrical Contractors Assn. found facilities at Edgewater Park, Miss., inadequate and decided that its annual meeting would be held instead at Ritz-Carlton on the Boardwalk, at Atlantic City, N. J., from Oct. 14 to 18.

IAEE and Others

At the annual meeting of the Arizona section of the American Institute of Electrical Engineers in Tucson, Irvin W. Best, former vice-chairman of the institute, was named chairman for the coming year. Best is field electrical engineer with the Phoenix office of Allis-Chalmers Mfg. Co. Other officers include Carl A. Poppino, sales engineer, General Electric Co., Phoenix, vice-chairman, and F. J. Groat, Bureau of Reclamation engineer, secretary-treasurer. F. W. Percy, E. A. Lodge, C. M. Hart and E. A. Gissel were named to serve on the executive committee.

● Both the Southern California and Northern California Electrical Maintenance Engineers associations had F. H. Roby, general sales manager, industrial controller division, Square D. Co., Milwaukee, as their speaker at May meetings, May 15 in Los Angeles, May 16 in San Francisco. Roby spoke of and demonstrated timers of various types and kinds, emphasizing the need to select the appropriate timer for the operation desired. He also made a cycle meter demonstration of performance characteristics. The previous meeting of the southern California group was its 10th annual stag. Henri Ledeboer was the master of ceremonies.

● Arrangements to house, feed and provide for some 1,500 to 2,000 delegates who are expected to attend the first convention since 1941 of the International Brotherhood of Electrical Workers, in San Francisco, Sept. 2-13, are being made by J. Scott Milne, international vice-president, San Francisco, and his staff. The last convention was held in St. Louis in 1941. The meetings will be held in the Civic Auditorium. Hotel facilities of the entire bay region are being mobilized for the large groups expected.

PCEA Urges County Uniform Ordinances

M. G. Sues, chairman of the PCEA code and ordinance committee, has reported that letters have been sent to all utility members of the association recommending that the ordinance adopted by Santa Clara County be actively sponsored for enactment in the larger counties in the state. The Santa Clara County ordinance appears to be entirely practical and to meet with the acceptance of rural establishments, since it excludes farms of two and a half acres or more and all buildings thereon used exclusively for farm purposes. However, it does allow farmers to apply for wiring inspections upon the payment of nominal fees.

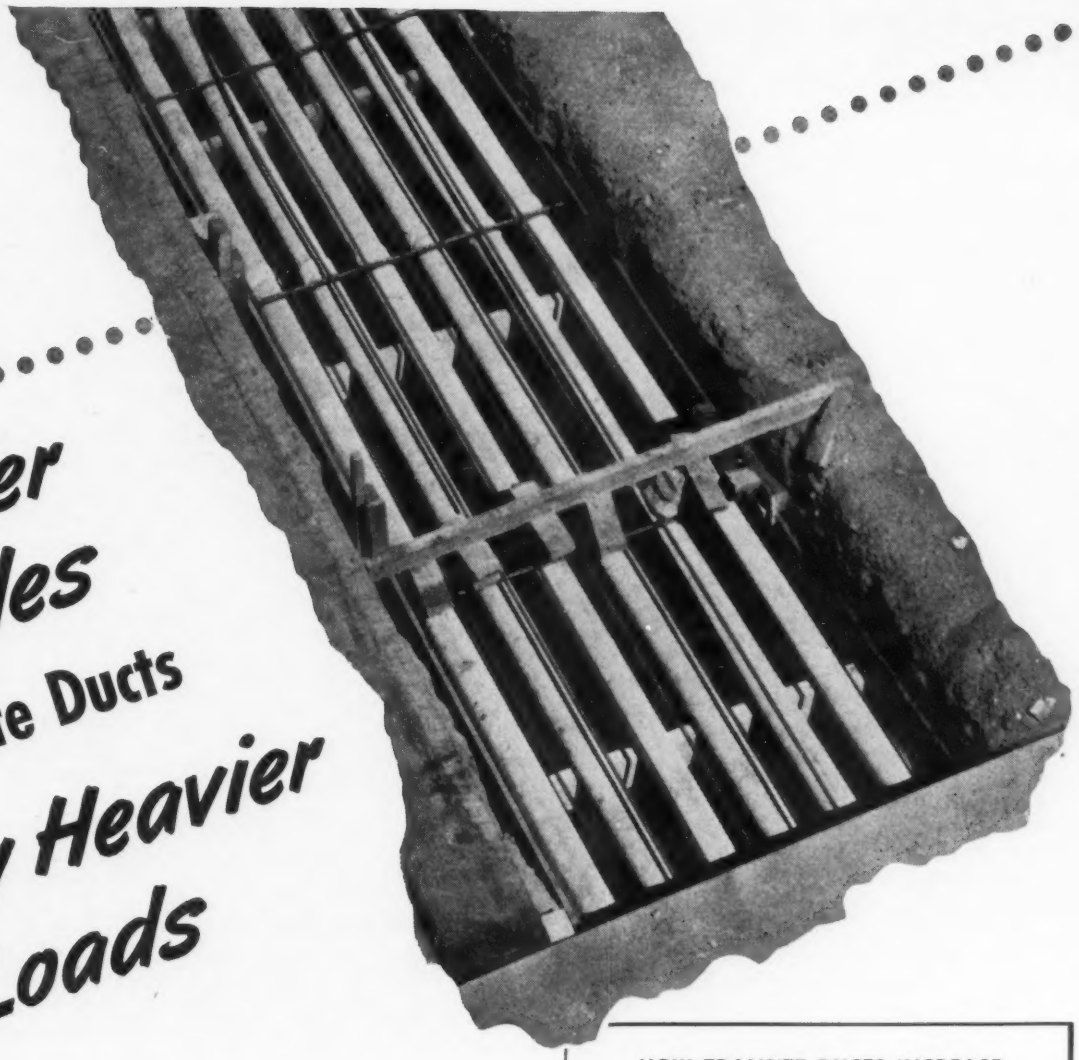
Sues further reported that letters had been sent to all class "A" members of the association, warning them that highly restrictive ordinances are a detriment to the industry and impose unnecessary regulations upon the public. An appeal was made to all members to assist the code and ordinance committee in preventing the enactment of ordinances that are unreasonably restrictive and that are not basically designed to protect the public welfare. Association members were especially requested to report to the code and ordinance committee instances in which such ordinances are proposed, or likely to be proposed.

Uniformity, the PCEA contends, is in the best interest of all branches of the industry and the public.

NEMA Counsel

Two representatives of the National Electrical Manufacturers Assn., R. R. Irvine, legal counsel, and W. J. Donald, managing director, were in Los Angeles on May 21 for a meeting to discuss procedures to be followed in gaining recognition and acceptance for national wiring standards. The meeting was arranged under the auspices of the League of California Cities and was called so that the NEMA officials could discuss with California city attorneys the most efficient methods of drafting, and promoting the adoption of, wiring codes. A variance has existed between the procedures recommended by NEMA and those acceptable to California municipalities and this meeting was called to discuss the problem with a view to achieving uniformity. Ten representatives of California cities attended.

Cooler Cables in Transite Ducts Carry Heavier Loads



Increases of as much as 15% in current carrying capacity have been measured in cables sheathed in Transite Ducts!

The figures in the test case illustrated, made by Johns-Manville Research Engineers in collaboration with several leading cable engineers, apply to a single Transite Duct compared with an organic duct.

Transite Ducts have been proved to dissipate I^2R losses 13% faster than other ductways tested, thus keeping cables cooler. Higher load capacity, reduced copper losses and increased cable insulation life are the results.

Made of asbestos and cement, Transite Ducts are strong, immune to rust and rot. They are incombustible and unaffected by electrolysis or galvanic action. A permanently smooth bore makes possible long cable pulls and easy replacements. Long, lightweight lengths can be quickly and economically installed. In addition, a full line of fittings simplifies even the most complicated installations.

JOHNS-MANVILLE JM PRODUCTS

HOW TRANSITE DUCTS INCREASE CABLE CARRYING CAPACITIES

Tests made on a lead-sheathed 500,000 CM cable insulated with ½" paper and placed inside a single duct encased in concrete.

Sheath Temperature, 145° F.
Ambient Air Temperature, 90° F.

CURRENT CARRYING CAPACITY

Transite Duct	796 amperes
Organic Duct	691 amperes
Difference	105 amperes

(Figures are results of tests conducted in the J-M Laboratory in collaboration with several leading cable engineers.)

For full information on Transite Ducts, write for Data Book DS-410. Johns-Manville, Box 290, New York 16, New York.

Johns-Manville TRANSITE DUCTS

CONDUIT for use without concrete
KORDUCT for concreting in

NEWS *of the industry*

INITIATIVE SEEKS TO CURB PUD COMMISSIONERS

An initiative which would strip Washington PUD commissioners of some of their powers has been filed with the secretary of state at Olympia.

The bill would require the commissioners to submit purchases of operating electric properties to voters at a special or regular election. Approval also would be required before PUD officials could issue revenue or other bonds or incur any other financial obligations in connection with such acquisitions. Both issues would have to be voted upon simultaneously.

A section of the bill exempts any deal pending or consummated at the time the act becomes effective and thus the Puget Power purchase would not be affected.

The initiative was filed by E. S. Johnston, former mayor of Pasco, who states he represents a committee composed of himself, E. R. Wells, Prosser, and J. B. Power, Vancouver. Johnston declares that the way the present law is written, any two members of a PUD commission can plunge a district into a purchase deal or condemnation suit no matter how the people of the district may protest. The vote requirement would apply only to bonds issued to finance purchase or condemnation and would not prevent a PUD which had acquired a system from expanding or improving its facilities by issuing bonds.

Oregon Voters Reject Five Public Power Measures

Oregon voters on May 17 turned down five of six public ownership proposals submitted.

Astoria voters defeated by a vote of nearly three to one a charter amendment to authorize the city to issue up to $2,000,000 of revenue bonds for a municipal power system. County PUD proposals were turned down in Astoria in 1938 and 1941.

A proposal to set up a PUD in Linn County, to include most of the area outside Albany and Lebanon, was defeated for the fourth time. A separate PUD in the city of Lebanon also was turned down.

Malheur County rejected a PUD by a vote of 2,571 to 1,087. Only three of 23 precincts approved the issue.

Northern Lincoln County, on the Oregon Coast, likewise was against a PUD. This PUD would have embraced a small area which heretofore has excluded itself from the Central Lincoln PUD.

The Dalles voters favored a franchise to the Northern Wasco County PUD, clearing the way for construction of a competing system. The Dalles city council had turned down the franchise request three times.

Seattle Intervenor at PUD Purchase Hearing

Seattle, Wash., will file as intervenor at a state supreme court hearing on legality of the proposed purchase of Puget Sound Power & Light Co. by 15 Washington PUDs, it was announced last month.

Corporation Counsel A. C. Van Soelen said the premise of this brief will be that "no PUD has the right to invade unorganized areas such as the Seattle-King County area," an argument similar to those he presented in the test suit won by the PUDs in Skagit superior court.

Voters Must Approve Power Plant Sale, Court Rules

Sale of the Wickenburg, Ariz., electric power plant and distribution system must be approved by the voters before it is effective, according to a recent state superior court ruling. Injunction against the city council was brought by eight taxpayers, after the voters had turned down, 232 to 152, a plan to have the city-owned system operated by Central Arizona Light & Power Co.

Main issue was whether the distribution system is real or personal property. Although the system is listed on the county tax rolls as personal property, Superior Judge Dudley W. Windes ruled it real estate, with sale illegal without approval by municipal voters.

● DECLARING that it is entitled to jurisdiction over such items, Arizona Corporation Commission has ordered the Tucson Gas, Electric Light & Power Co. to show cause why it should not reduce the 8% interest rate on a $160,000 demand note on its subsidiary, Tucson Rapid Transit Co.

● PETITIONS for formation of a PUD are being circulated in Polk County, Ore. The proposed district would extend over some 104 sq. mi. Population is estimated at 4,000.

TOLEDO AND BONNEVILLE CLASH ON POWER CONTRACT

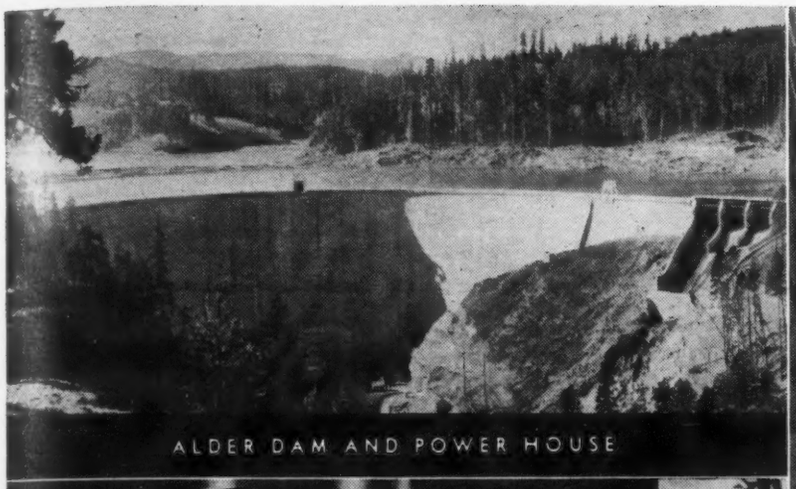
Bonneville's right to discriminate between two independent public bodies and give one a monopoly on its power service may be tested in a clash between the federal agency and the city of Toledo in Lincoln County, Ore.

The city, which recently announced its intention to cut loose from the Central Lincoln County PUD (EWEST, March, p. 90), in November 1946 asked Bonneville for a power contract, to be effective after completion of the agency's Corvallis-Toledo line, now under construction. A reply from Chesley Brazil, southwestern BPA manager, on April 15, stated that at the time the PUD acquired West Coast Power Co. properties, Bonneville agreed that it would give every support to the district in maintaining district operations intact and that it "would not be feasible" now to serve the city of Toledo as a separate municipal system.

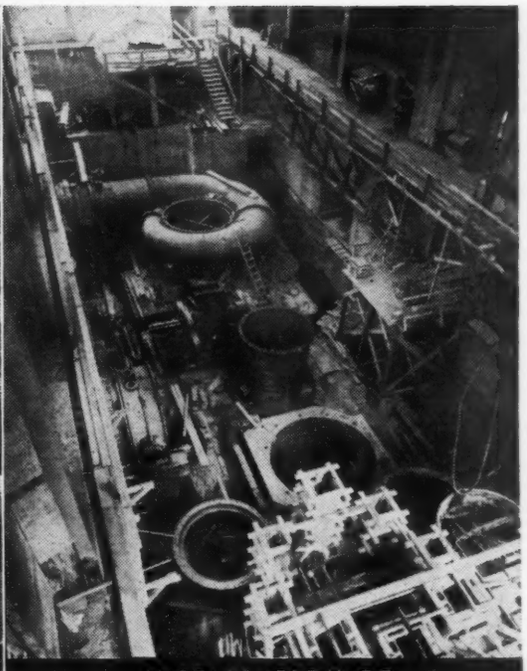
In a reply direct to Administrator Paul J. Raver, Stanley Thomson, Toledo Water & Light commissioner, pointed out that prior to creation of the PUD, Toledo had committed itself to establishment of a municipal system and that PUD elections had been defeated consistently since. In maintaining its independence from the PUD, the city has acted in strict accordance with the law and processes of democratic government, he said, and the city has continuously given notice of its intentions. Pointing out that the city intends to buy present PUD distribution lines in and around Toledo if the PUD wishes to sell, he expressed the hope that negotiations would be completed for the city to have its municipal system ready to operate when the Bonneville transmission system is completed sometime this summer.

Brazil is a former manager of the West Coast Power Co., a fact pointed out by Thomson, who added that Brazil was very active through the years in promoting formation of the Central Lincoln County PUD.

● AT REQUEST of both companies, the Arizona State Corporation Commission last month started rehearing on areas to be served by Arizona Edison Co. and California Electric Power Co. Previously the commission had given jurisdiction within the city of Yuma to Arizona Edison and in surrounding agricultural areas to California Electric Power.

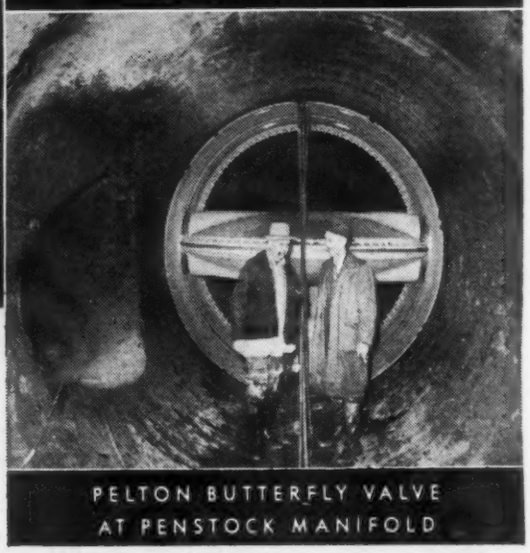


ALDER DAM AND POWER HOUSE



INSTALLATION OF PELTON TURBINES

SERVOMOTORS AND CONNECTIONS REGULATE WATER TO PELTON TURBINE



PELTON BUTTERFLY VALVE AT PENSTOCK MANIFOLD

PELTON

builds the Turbines which "HARNESS" water

'Way back in 1880, soon after the first hydro-electric power houses were built, Pelton discovered a better way of building turbines. This new turbine had buckets with central-dividing splitters. Its use became world-wide.

Pelton also pioneered the reaction-type turbine which is used in the power house pictured above.

Through all the history of hydro-electric achievement Pelton has progressed side-by-side with the electric companies in the manufacture of reliable products.

To prevent dangerous water hammer in long penstocks, Pelton designed the balanced-plunger-type relief valve which opens automatically to bypass the water as the turbine gates close. Pelton builds free-discharge valves, check valves, throttle valves, butterfly valves and others used in safely controlling great amounts of water.

Pelton engineers are specialists in the design of hydro-electric turbines and their accessories.

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The PELTON WATER WHEEL Company

Subsidiary of The Baldwin Locomotive Works

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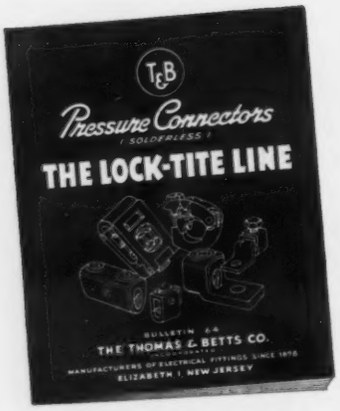

THE WORKS!

This New Bulletin Tells You WITH WHAT AND HOW To handle ALL of Your Standard Wiring Jobs

It simplifies your selection of Pressure Connectors which have been Approved by the Underwriters Laboratories. Gives engineering tables and test data. Shows how each compact, easy-to-tape Lock-Tite Connector takes a wide variety of overlapping cable sizes. Illustrates the ease of installing. And shows recent developments of T&B Laboratories.

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ELECTRIC PROPERTIES ARE OFFERED TO PUBLIC AGENCIES

If Tucson Gas Electric Light & Power Co. common stock is purchased by the Southern Union Gas Co., Dallas, Texas, options for sale of electrical facilities of the Arizona utility will be offered to the city of Tucson, the Arizona Power Authority, and the Trico Electric Cooperative Inc., it was announced recently by J. R. Cole, vice-president of Southern Union.

If its bid for the 147,000 shares of common stock owned by Federal Light & Traction Co. is accepted, Southern Union proposes to allocate the municipal electric system to the city of Tucson; the transmission lines and standby plant in the Tucson area to the power authority; the low transmission lines and rural distribution facilities to the co-op. Southern Union would operate the gas system only.

Meanwhile, an enlarged board of nine directors was proposed for the Tucson company during a recent securities and exchange hearing in Philadelphia. Heading the group would be J. R. Snider as president and general manager, replacing M. A. Pooler. Snider formerly was president and general manager of the New Mexico Power Co., Santa Fe.

Others on the list, to be filed shortly in a formal statement to the SEC, include C. H. Nichols, first vice-president, H. H. Saunders, vice-president and production superintendent, H. A. Person, vice-president (also vice-president and chief engineer of Federal Advisers Inc., service subsidiary of Federal Light & Traction), C. L. Clawson, secretary-treasurer, and W. E. Johnson, R. T. McBain, J. T. Pathe and W. P. Southard, directors.

PG and E To Buy Electric System

Pacific Gas and Electric Co. will purchase the electric distribution system in Tuolumne, Calif., from the Turnback Creek Light & Power Co., if state railroad commission approval is received.

The Turnback Creek Co., wholly owned subsidiary of the West State Lumber Co., which has provided Tuolumne with lighting service since 1900, operates a steam-electric generating plant and supplements the supply with power purchased from PG and E. The Tuolumne system now serves electricity to 471. It was indicated that bills, under PG and E rates, will be cut approximately 10%.

● SPRING CITY, Utah, has received a $2,250 loan from the Federal Works Agency to finance the planning stage of an $80,000 project to enlarge municipally owned hydroelectric facilities. Under WFA procedure, the loan bears no interest and must be repaid at the time construction is started.

B. C. Power Commission Buys Two More Plants

Purchase of two more small electric power plants in the Okanagan Valley in British Columbia by the B. C. Power Commission was announced in the legislature recently. At the same time, it was stated, improved service was to be given to eight communities on the coast as part of the $800,000 development project of the commission.

These developments include: Construction of generating and distribution plants at Terrace at a cost of $122,607; reconstruction of the generating plants at Golden, Alert Bay, Vanderhoof, Smithers-Telkwa and Quesnel, to cost $557,378; purchase of the plants now operated at Peachland by the Corporation of Peachland and at Westbank by the Westside Utilities, the connecting up of these two systems and expansion in service, with a total cost of $115,500. Construction of 18 diesel electric units at a cost of $651,195 is involved in the program.

Utility Power Contract Approved by Commission

San Diego Gas & Electric Co. has received California Railroad Commission approval on extension to Dec. 31, 1948 of its power contract with San Diego Electric Railway Co.

New base rates provided under the contract will be $1,215 monthly plus $1.50 per kw. a month demand charges and energy charges of 40 cents per kw. a month. Based on fuel oil prices of $1 per barrel and 16c per mcf. for natural gas, the rates provide for differentials of 1.6c per kwh. for each 5c variation of fuel oil above or below $1, in line with the late rise on fuel oil prices. On natural gas prices, 2c a kwh. provides for each 1c variation.

FPC Sets Original Cost For Seattle Development

Original cost of Seattle's Skagit River hydroelectric project has been set at $19,302,826 by FPC. The commission disallowed $827,107 of the $20,129,833 claimed for completed parts of the development.

Completed are the Diablo Dam and power house, transmission lines and communication system from Diablo Dam to Seattle, and the first step of Ross Dam.

FLUOR-O-SHIELD*

LIGHT DIFFUSER FOR FLUORESCENT LAMPS

No glare from any angle. Casts no shadows. Fluor-O-Shields do not catch dust or dirt.

Snap-on clips for instant attachment or removal without bolts, screws or tools.

No time lost for installation. Just snaps on. Shipped ready for immediate attachment.

...means better lighting at lower cost!

Better lighting means more efficient work, more sales, and improved conditions for store displays, production lines and office layouts. And, Fluor-O-Shield diffuses fluorescent light evenly, eliminates glare and minimizes stroboscopic effect. Lower cost because Fluor-O-Shield is a simple, one-piece louver that is instantly attached or removed, available in two sizes (40W and 20W), is equally suitable for continuous or unit mounting. Of lightweight aluminum, white baked enamel, Fluor-O-Shield causes no stress or strain on lamps or sockets.

SALES-SLANT for DEALERS: Take note of the profitable business immediately possible selling Fluor-O-Shields as a multiple item with fluorescent lamps and starter replacements. Fluor-O-Shields require small stock space and are rapid turn-over items. A single demonstration of the advantages of Fluor-O-Shield can result in countless sales to plant, factory and store owners.

Fluor-O-Shields are available in sizes for 40W and 20W fixtures and are shipped ready for immediate attachment. If your distributor does not stock Fluor-O-Shields, ask him to write us.

• Eliminates Glare • Decorative • Instantly Attached • Fits Most Open-Lamp Fluorescent Lamp Fixtures • For Factory, Store, Office and Home Lighting • Of Durable, Lightweight Aluminum, finished in White Baked Enamel.

SPECIFICATIONS

Cat. No.	Length	Fits Lamp	Units Per Pkg.
27-1-40	46⅞ in.	40 watt	12
27-5-40	22⅞ in.	20 watt	12

$1.95
40 Watt—46⅞ in.

$1.25
20 Watt—22⅞ in.

**Trade Mark—Patent Pending*

FLUOR-O-SHIELD by CAMFIELD MANUFACTURING COMPANY • GRAND HAVEN, MICHIGAN

All you need to hang Chain Suspension Fixtures is a screw driver plus a

HYDEE HANGER*

Just connect wires, screw to outlet box and the job's done—in a few minutes!

Self-grounding—2-wire cord and plug may be used. Fits standard 4" or 3¼" outlet box or plaster ring. Complete with receptacle, two 5-foot chains, "S" hooks and cord clips. Nothing else to buy. $1.50 Each List

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*Patent No. D-141024. Others pending. Underwriters approved.

904

IT'S EASY TO SEE WHEN IT'S DAY-BRITE Lighting

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IDAHO POWER ANNOUNCES DEVELOPMENT PROGRAM

Further development of existing power sites at Malad River in Gooding County and the Lower Salmon Falls on the Snake River will be undertaken by Idaho Power Co., in the largest single expansion program of its history.

C. J. Strike, president and general manager of the company, estimates cost at $6,500,000. This is in addition to outlay for construction of a new power plant at the Upper Salmon site on the Snake, a project now about half complete.

A 6,000- or 7,000-kw. generating plant will be built 1¼ mi. above the existing 12,000-kw. Malad plant, completed in 1912. At the Lower Salmon site, a new plant, now in the planning stage, either will replace the present plant, built in 1910, or will be constructed on an adjacent site. Present plans call for three new generators, increasing capacity at Lower Salmon 7,200 to 45,000 kw.

Engineering surveys and preliminary work have been started by Morrison-Knudsen Co., contractors, and completion of the plants is expected in 1948.

The company is now working on a 16,500-kw. addition to its Upper Salmon development and is installing units 3 and 4 in a new power house. A 138,000-volt, 120-mi. transmission line is being built from the two Upper Salmon plants to Boise and from there to Emmett.

Other transmission lines being constructed include a 69,000-volt line from Vale to Harper, Ore., a distance of approximately 25 mi.; a 69,000-volt line from Juntura to a point near Van, Ore., about 45 mi.; 46,000-volt 44-mi. extension into Jordan Valley, Ore., where the company has recently purchased the Jordan Valley Rural Electric Cooperative; a 69,000-volt 33 mi. transmission line from Weiser to Cambridge, in Idaho.

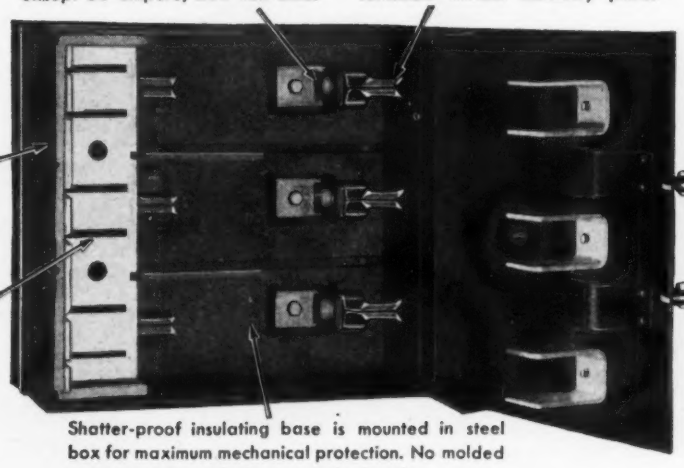
Bonneville Buys Station Site Near Tillamook

Negotiations have been completed by Bonneville Power Administration for purchase of a substation site just east of Tillamook, Ore. A 6,000-kva. transformer will be installed there to deliver power to the Tillamook PUD, when a 66-mi., 115,000-volt transmission line has been completed from BPA's Salem substation.

Two sections of this line, from Willamina to Grand Ronde and from Boyer to Tillamook, are now in service. The remaining sections, from Salem to Willamina and from Grand Ronde to Boyer, will be ready for service this summer.

Notice the sound design and rugged construction of this Saflex Switch Unit

A good reason for choosing Saflex Distribution Panelboards



Solder-solderless lugs can be used either as solderless connectors or as solder lugs or both. Furnished on all except 30 ampere, 250 volt units.

Positive pressure fuse clips have high conductivity and assure automatic contact pressure at the fuse terminals without auxiliary parts.

Cam-action provided by handles near switch jaws where it is most needed. This cam-action supplies (with minimum manual effort) the considerable force necessary to provide high contact pressure.

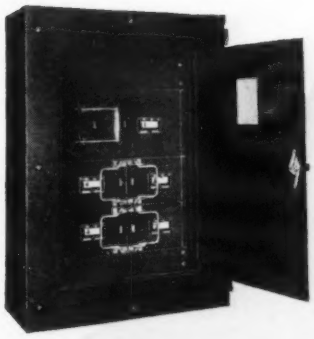
Cover can be locked in either the ON or OFF position by means of a padlock on the bracket.

Arc suppressor block greatly increases the rupturing capacity.

Ranging from 30 to 600 amperes, Saflex Switch units are for use in systems up to 575 volts A.C. or 250 volts D.C.

Shatter-proof insulating base is mounted in steel box for maximum mechanical protection. No molded parts are exposed when cover is closed.

● Notice how simplicity, sturdiness, and safety are built into Saflex Switch units. Opening and closing unit doors operates switch units. Door is permanently anchored; it carries switch blade assembly only, and covers all live parts when closed. When door is open, all accessible live current-carrying parts are dead. All circuits may be opened safely under maximum load. All poles are broken simultaneously, preventing single-phasing. All units except 600 ampere size have rotary switch units. Yale locks on panel cabinet doors prevent unauthorized access. ● For fast, simple installation, panel box has oversize wiring gutters and may be shipped separately for roughing in during early stages of construction. Interior and front are separate units, and may be installed later.



Write for Bulletin 2500. Address Square D Company, 1320 E. 16th Street, Los Angeles 21, Calif.

SQUARE D COMPANY

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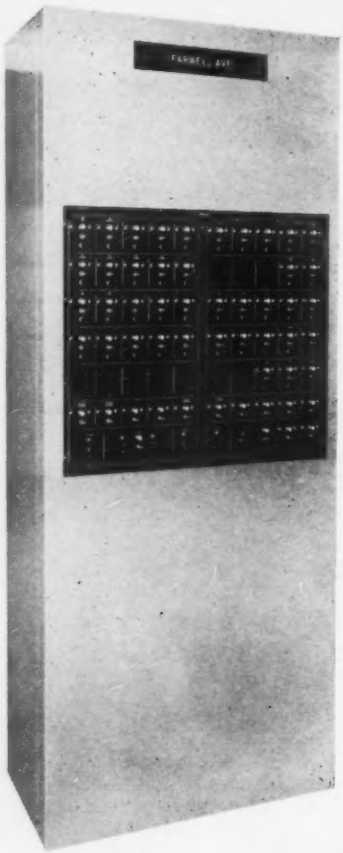

SUPER-TROL
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FLEXIBLE

Whether you want supervisory control over one breaker, or a hundred and one, SUPER-TROL'S custom designing will meet your exact requirements. Infinite design flexibility meets the special problems of each power system.

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Find out how SUPER-TROL can help you. Write today for special bulletin describing SUPER-TROL applications.

CONTROL CORPORATION

718 Central Avenue
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CENTRAL ARIZONA PLANS STEAM PLANT ADDITION

Installation of a 25,000-kw. turbine at its Phoenix steam plant is planned by Central Arizona Light & Power Co., as part of a $1,000,000 improvement program scheduled for electric and gas properties. Completion is scheduled for this year, if materials are available.

According to E. H. Coe, company president, the additional capacity is needed to guard against a threatened power shortage in the area. He stated that the company had negotiated with the Arizona Power Authority for additional power but would require more than would be available from that source.

Coe said that 989 residential and 176 commercial electric customers had been added to company lines within recent months. He pointed out that since Jan. 1, 1945, the company had built 92 mi. of rural line and had added some 235 rural electric customers, in addition to almost 10 mi. of irrigation pumping lines. Rural extensions are now being completed into additional areas.

Dam Across Columbia at The Dalles Recommended

Construction of a dam across the Columbia River at The Dalles, Ore., with installation of three initial power units, has been recommended by Portland district and North Pacific division army engineers in a report to the chief of engineers at Washington, D. C. Cost of the project, based on 1940 price levels, is estimated at $90,480,000. With 12 of the 15 power units installed, cost is estimated at $131,629,000.

Eventual installation of the 15 power units, 75,400 kw. capacity each, would provide a total capacity of 1,131,000 kw.

If the plan is approved by the army chief of engineers, construction of the dam must then be approved by the governors of Oregon and Washington and by various federal agencies, after which authorization and appropriations by Congress would have to be obtained.

● USBR on May 24 called for bids for construction of a 120,000-kw generator and a 165,000-hp. turbine for the right power house at Grand Coulee Dam. Bids for the generator will be opened at Denver on July 5 and bids for the turbine were to be opened on May 28. According to present schedules, first unit in the right power house will be operating by November 1948.

DEPENDABLE POLE LINE CONSTRUCTION *DEMANDS*

such as

★ Cross Arm Braces

and

★ Pole Steps

and

★ Guy Clamps

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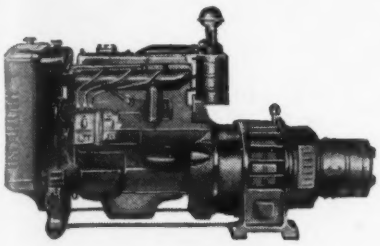
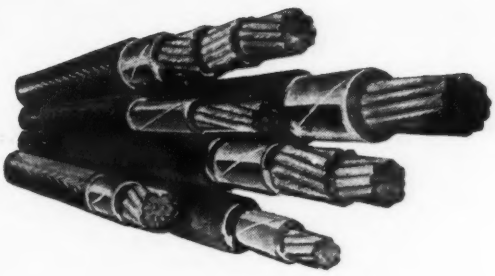


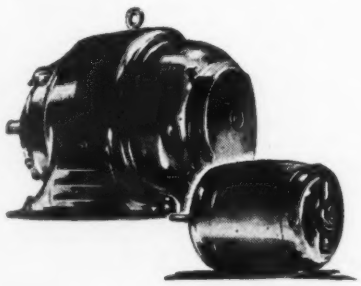
GENERATORS

If unit power generation is your problem, it will pay you to check our large lists of this type of equipment. We have gasoline, steam, Diesel and electric driven generators—(and generators without prime movers) in a wide range of load and voltage characteristics, in both a-c and d-c.



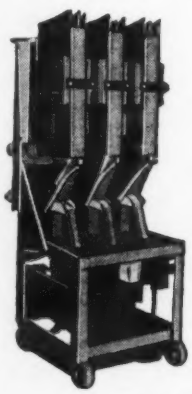
WIRE & CABLE

Our inventory includes an innumerable variety of wire and cable in sizes and insulations usable in industry. Many types conform to underwriters' specifications—others were made for special purposes but are adaptable to industrial and commercial applications.



MOTORS

We have a large supply of electric motors, both a-c and d-c, in unusual speeds, voltages and loads. If you have applications in which these motors can be adapted, inquire at your nearest Regional Office for full particulars and prices.



SWITCH GEAR

Special items in this category are now available if you can use them. Check your requirements and avail yourself of this opportunity to purchase switch gear at considerable savings. Consult your nearest W. A. A. office for description, location and prices.

STANDARD AND SPECIAL ELECTRICAL EQUIPMENT

FOR SALE

priced for immediate disposal

The War Assets Administration offers you government-owned surplus electrical machinery and equipment for your reconversion program at *substantially reduced prices.*

The offer includes wire and cable, generator sets, transformers, switch gear, wiring devices, sub-station power conversion and protective equipment. Much of it is special but adaptable to a large variety of uses.

It has been *priced to sell* and represents attractive bargains to the alert and resourceful industrialist engaging in speedy reconversion.

(Cut out and send to the nearest WAA office listed below)

War Assets Administration: I am interested in the following checked items:

- ☐ WIRE & CABLE
- ☐ GENERATORS
- ☐ SWITCH GEAR
- ☐ SPECIAL ELECTRIC MOTORS
- ☐ WIRING DEVICES
- ☐ POWER CONVERSION EQUIPMENT
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OFFICES LISTED BELOW ARE TEMPORARILY IN RECONSTRUCTION FINANCE CORPORATION AGENCIES

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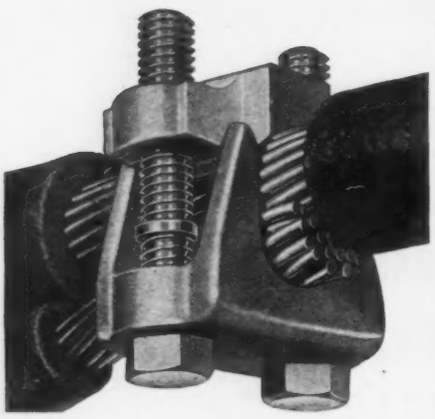
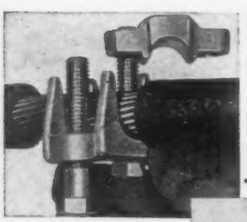
VETERANS OF WORLD WAR II: To help you purchase surplus property, a veterans' unit has been established in each WAA office.

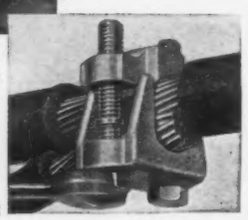
MATTHEWS UNICLAMP CONNECTORS



Made for use on copper or aluminum wires from 2/0 to 1000 MCM inclusive. They will connect two wires of their rated size or one wire of their rated size with one or more smaller tap-off wires down to No. 8 solid. They have many advantages over the larger sizes of connectors of the split bolt and other designs as they provide greater pressure between wires, hence greater holding power, are less costly, are easier to install and the assembled design is such that parts cannot become separated.



Fit on conductor as shown. Position top member and partially thread in free bolt.



Insert tap wire and equally draw up both bolts.

Write for Bulletin 206

W. N. MATTHEWS CORP.
3722 FOREST PARK BLVD.
ST. LOUIS 8, MO.

SPOKANE FIRM AWARDED COULEE LINE CONTRACT

Low bid of $68,522 for construction of 31 mi. of high-voltage transmission line from Grand Coulee Dam to the Foster Creek Dam site was submitted by the Electric Smith construction firm of Spokane. The section is a portion of the Bonneville Power Administration's proposed 230,000-volt wood-pole transmission line from Grand Coulee Dam to Snohomish, Wash.

To be operated initially at 115,000 volts, the line will connect with a planned 115,000-volt line from Foster Creek to Brewster, for service to the Okanogan PUD which has contracted for 2,500 kw. of Grand Coulee power.

Specifications for the 31-mi. section of the line call for construction of 2.3 mi. of 115,000-volt line and 29.7 mi. of 230,000-volt line.

Irrigation Districts Will Receive Hetch Hetchy Power

Completion of a $500,000 substation and 23 miles of tie-line to the Hetch Hetchy Moccasin plant last month prepared the way for flow of power from the San Francisco development to the Modesto and Turlock irrigation districts in California. The irrigation districts will take approximately 10% of the Hetch Hetchy output. Other outlets will be for municipal use and sales to the Kaiser interests. San Francisco was receiving $2,400,000 annually for the power from Pacific Gas and Electric Co., when the Raker Act was enforced in mid-1945.

Seattle Seeking Permit for Third Step of Ross Dam

Application for permit to construct the third step of Seattle's Ross Dam will be made shortly to FPC, according to City Light Superintendent E. R. Hoffman. When the third phase is completed, the dam will be 545 ft. high.

Before work can start on the third step, power tunnels being constructed for the second step must be completed. They are now about half finished.

● A CONTRACT for construction of transmission lines for the Northern Electric Cooperative of Openheim, Mont., has been awarded to the Northwestern Engineering Co., Rapid City, S. D. The firm received the contract on a low bid of $435,412. The lines will serve rural communities in northern Valley, western Daniels, and Roosevelt counties, and the towns of Openheim, Glentana, Richland, Peerless and Four Buttes.

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THE HOPE WEBBING COMPANY, INC.
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- Varnished Paper.
- Varnished Tapes.
- Varnished Sleevings (Spaghetti).
- Transflex and Hyflex Tubings.
- Harvel OIL STOP.

JOHN A. MANNING COMPANY, INC.
- Pressboards, Insulating Papers.

DUREZ PLASTICS & CHEMICALS, INC.
- Phenol Formaldehyde Molding Powder.

PLASKON DIVISION
Libbey-Owens-Ford Glass Co.
- Urea Formaldehyde, Melamine Molding Compound.

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"Full Time" INDUSTRIAL Fluorescent Units

FOR MORE FOOT CANDLE POWER

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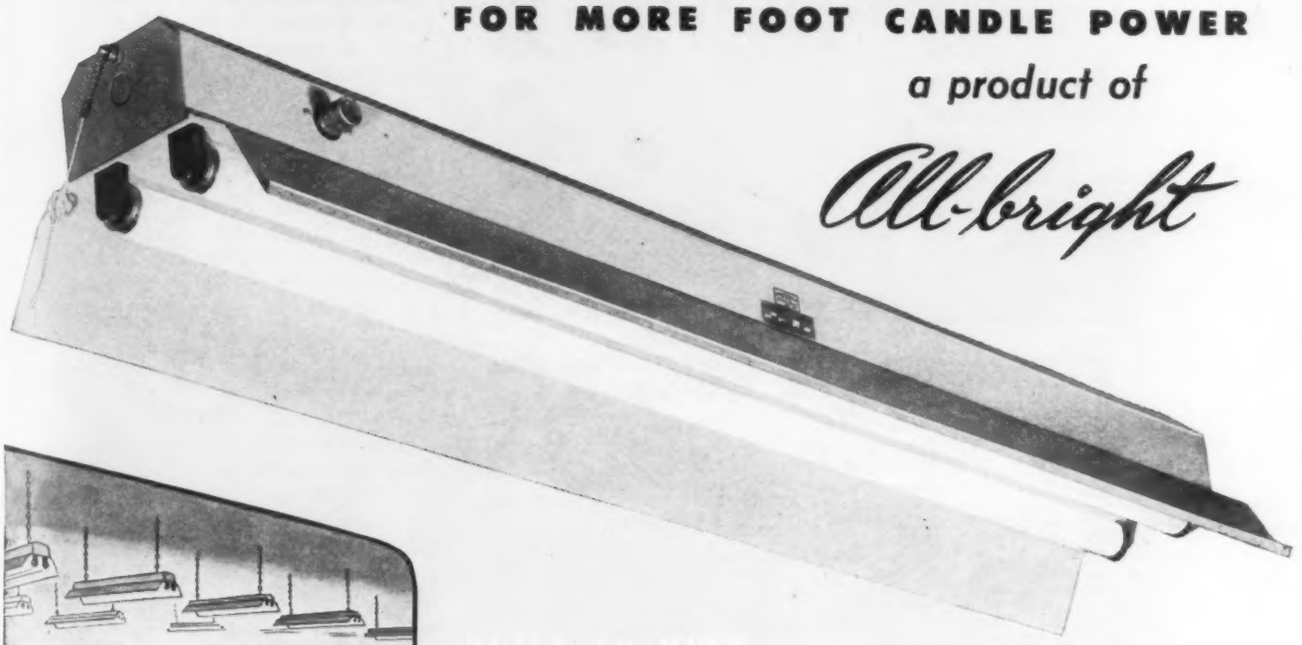
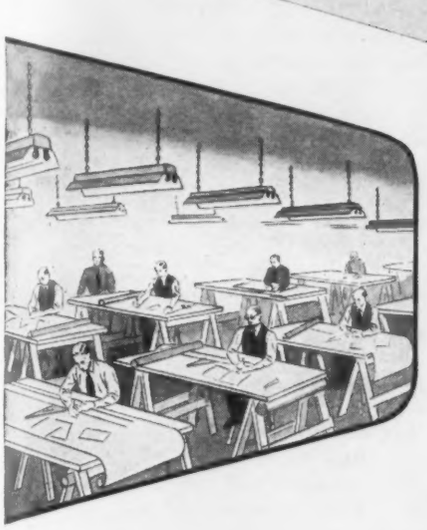
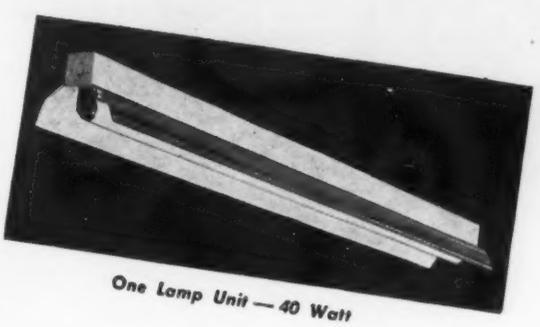
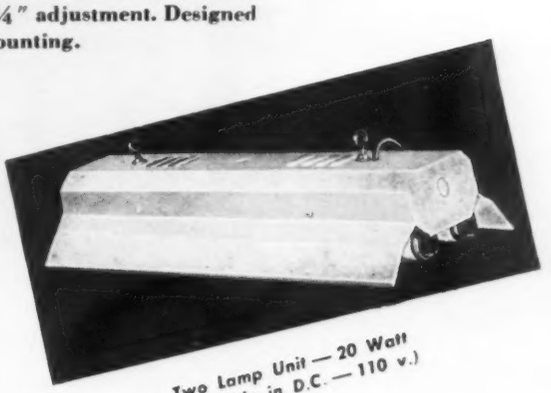




The Lighting unit of tomorrow—today!...engineered for "full-time", trouble — free service. To assure accurate alignment of lamps, removable lamp-holder plates have been created for easy maintenance *without removing fixture from the outlet.* Also features louvered housing, remote starter control and removable steel reflector. Furnished with screw eyes for "easy level" chain hanging up to 1¼" adjustment. Designed for chain, stem or surface mounting.



One Lamp Unit — 40 Watt



Two Lamp Unit — 20 Watt
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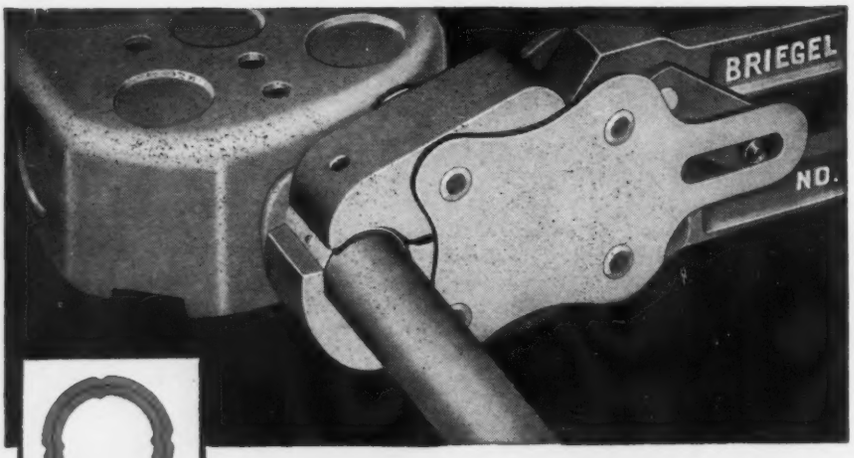

Cross section Showing Indentations.

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COPPER BUS BARS WILL REPLACE SILVER BARS

A $36,000 contract for refabrication and installation of more than 2,000,000 lb. of copper bus bars in the Mead aluminum reduction plant near Spokane, Wash., was awarded the General Machinery Co. of Spokane by the War Assets Administration. The bars are being shipped from the Torrence, Calif., aluminum plant controlled by the Reconstruction Finance Corp., and will replace the 2,000,000 lb. of silver bus bars lent by the U. S. Treasury to the Defense Plant Corp. for operation of the Mead plant during the war.

The war shortage of copper led to an agreement between the U. S. Treasury and the RFC whereby government-owned silver was utilized in the Mead plant for operation of six potlines. Only two of the potlines are now being made ready for use and a later contract will place in operation the remaining four.

The Mead reduction plant was recently leased to the Permanente Metals Corp., of which Henry B. Kaiser is president.

Utah Power Planning Long Rural Extension

Transmission lines carrying electricity to rural communities of Box Elder County, Utah, and Oneida County, Idaho, will be completed this fall by Utah Power & Light Co. The $170,000 project, involving construction of 173 mi. of line, will be the longest rural extension in the company's history.

From the Dewevville, Utah, substation, 31 mi. of 44,000-volt line will run to Blue Creek, Utah, where a 100-kva. substation will be built. From there voltage will be dropped to 7,200 volts and fed into the remaining 142 mi. of distribution line. According to R. R. Rowell, division manager at Ogden, the project is expected to benefit 255 new rural customers.

● THREAT of a strike by workers on the Seattle City Light Ross Dam project was temporarily averted recently by a 12% wage increase granted by the contractors. City Council will decide whether the contract will be revised by inclusion of an escalator clause under which City Light would furnish 35% and the contractors 65% of proposed increase.

● REDDING, Calif., has announced an expansion program for its municipal electric system, which will double present capacity. The project will begin this summer and will cost about $15,000, bringing capacity to 9,000 kw.

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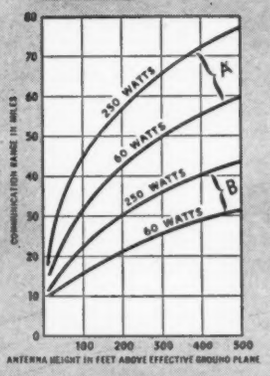
WITH THE *New* DE LUXE REMOTE CONTROL



Effect of antenna height and location on communication range. A applies to quiet residential and rural areas. B applies to high noise-level locations, such as congested or industrial areas. These curves are for estimating purposes only.

WHEN you plan your radio dispatching system *spot* your station equipment for maximum performance and minimum cost. Do it with one or more G-E De Luxe Remote Control units at dispatching headquarters. Give your dispatchers more than one control point for emergencies. For this service the G-E De Luxe Remote Control unit has outstanding features:

- Automatic level control assures proper modulation regardless of "speech habits". This feature reduces distortion, improves message reception.
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- A complete FM receiver, with meter, gives positive indication of actual carrier level. Meter checks all receiver functions—receiver can be used in emergencies if station receiver fails.
- Second meter indicates outgoing voice level.
- Cyclometer-type electric clock facilitates log entries.
- Single-pair wire line meets all FCC and operational requirements. *Includes the G-E feature of station receiver squelch adjustment from headquarters.*
- Line amplifier with mixing circuits, level-balancing controls, master gain control, and selector switches permit use of one or two remote pick-up receivers and the local receiver.
- Key-type tone calling signal and carrier-on switches.
- Hinged top cover allows easy inspection and servicing. Key lock provides security and protection.
- *New* good looking cabinet, heavy-gauge steel construction, rounded edges, and *new* high lustre blue-gray finish.

G-E radio engineers, located in principal cities, will assist you in your remote control and other radio problems. Call or write your local G-E office, or the *Electronics Department, Section 502C, General Electric Company, Syracuse 1, N. Y.*

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These guards also protect the light bulb and prevent breakage when used around machines where water and oil might splash on the bulb. Guards also are grounded — an additional safety feature.

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WESTERN WATER SUPPLIES REDUCED SOMEWHAT

Deficient precipitation during April throughout the Western states, has resulted in a general reduction of previous estimates of summer water supplies, according to the Soil Conservation Service. Forecasts based on final seasonal snow surveys made early in May still indicate either ample or sufficient supplies in the northwestern and Pacific Coast states, but sharp reductions in expectations for southern Colorado, southern Utah, Nevada, Arizona, New Mexico, and western Texas; A summary follows:

Arizona: The precarious drought conditions previously reported have not been relieved. Reservoir storage is being depleted in order to make up for the subnormal stream flow.

California: April was the driest in 13 years, and the flow from melting snow will be about 10% less than had been expected. However, enough water for ordinary demands is indicated, and prospects still are good that most of the Sierra reservoirs will fill before the snow runoff ends.

Colorado: The situation has deteriorated, and can now be considered as generally only fair.

Idaho: April precipitation in the valleys was much below normal, but the heavy snow pack at higher elevations is melting about as usual. More snow than normal still lies at these elevations except for the Snake River country where conditions are about normal. The over-all prospect continues favorable.

Montana: The general outlook continues good. West of Continental Divide the April precipitation was scanty. Melting of high-altitude snow has been at a normal rate. In southern and eastern sections no shortages of water are expected. Yellowstone River is at the highest stage for this period that has been reported for the past 30 years. Reservoir storage is about the same as last year.

Nevada: Snow is melting rapidly in the eastern Sierra and the Humboldt River basin where April precipitation was subnormal. If these conditions continue throughout the irrigation season, local water shortages will occur in the later part of the season.

New Mexico: Prospects for water supplies from Rio Grande and Pecos and Canadian rivers are very poor, although some reservoirs accumulated substantial storage during April and may be expected to fill to about three-fourths capacity.

Oregon: A state-wide deficiency in precipitation during April will reduce total expected water supplies from some streams by about 10%. However, no water shortages are expected if normal conditions of precipitation and temperature prevail during the balance of the runoff season. Total water stored in all important Oregon reservoirs is 6% greater than of similar date last year, 8% greater than in 1944, and 2% greater than the ten-year average, 1936-45.

Utah: April precipitation was deficient but not enough so to change previous forecasts significantly.

Washington: The snow pack is still about twice the normal at the higher elevations, and the outlook is still for ample water supplies.

Wyoming: Despite deficient April precipitation, the runoff prospects are still generally favorable.

British Columbia: Above normal stream flow is still expected, with possible floods on low lands. By May 1 only the low snow had melted, leaving still to come nearly half the melt from medium levels up to about elevation 4,500 ft., and all the melt above that height. This residue represents the greater part of the snow pack.

Committee Will Coordinate Federal Construction Plans

The Columbia Basin Inter-Agency Committee has been set up to coordinate planning and construction by federal agencies of large-scale programs for development of water resources in the Pacific Northwest. Members of the committee include, BPA Administrator Paul J. Raver; Robert J. Newall, Boise, regional director of the USBR; Col. T. D. Weaver, Portland, Corps of Engineers; Lescher F. Wing, San Francisco, FPC, Horace J. Andrews, Portland, Department of Agriculture. States lying wholly or partly within the drainage area of the Columbia will be represented on the committee.

Bonneville Establishes Apprenticeship Training

To aid returning veterans, Bonneville has established a region-wide apprenticeship training program, according to Merrill J. Collett, BPA personnel director. The program is the first federally sponsored apprenticeship training plan to be developed in cooperation with organized labor, according to Collett.

Details of the program will be worked out by a council including three members of the Columbia Power Trades Council and Bonneville representatives. The plan will cover Oregon and Washington employees of Bonneville and will be applicable to electricians, linemen, carpenters, machinists, substation operators, painters and automotive machinists.

A Picture that means more *TO YOU* than a thousand words

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NEVADA WILL RECEIVE MORE BOULDER POWER

Governor Vail Pittman, chairman of Nevada's Colorado River Commission, who has been attempting for several months to obtain an added allotment of Boulder Dam power, announced May 20 that the Los Angeles board of supervisors had approved sale of 200,000,000 kwh. of electrical energy annually to Nevada at a rate of slightly over three mills per kwh. It was believed that this offer would be matched by Southern California Edison Co.

Nevada at present is seeking 35,000 kw. Under an existing agreement with southern California Boulder Dam power users, the state can obtain up to 44,000 kw. without installing an additional generator, if it gives notice of from six months to three years, depending on the amount of power desired. Blocking an agreement between the two groups on immediate Nevada needs, however, has been a fuel oil price increase which the Nevada group wished to ignore, and the California agents termed important. The southern California group presumably will allot the 35,000 kw. at a 3.25 mill rate that is tied in with fuel oil escalator clauses in the contracts, although Nevada industrialists are protesting this rate as too high for economical plant operation.

Nevada needs electrical power immediately for new industries located at the state's basic magnesium plant. USBR is planning to install an additional unit at Boulder, but application would have to be made to Congress for funds, with cost estimated at between $4,000,000 and $5,000,000. If approved the work would require at least three years.

● The Entire Electrical transmission and distribution system of Camp Callan, Calif., including poles, wires, and 92 transformers, has been sold to the San Diego Gas & Electric Co. as one step in disposal of the camp's 650 buildings and fixtures. Purchased from the government by the city of San Diego at a bargain price of $200,000, the camp is being dismantled for resale to contractors and veterans. Its facilities are expected to furnish materials for 2,500 homes.

● Two Suits seeking damages totaling $75,568 from the Washington Water Power Co. for alleged flooding of farm lands in Benewah County in north Idaho have been filed in U. S. district court at Boise. Both suits allege lands along the St. Joe River were flooded because of the company's operation of control gates on a dam on the Spokane River near Post Falls, Idaho.

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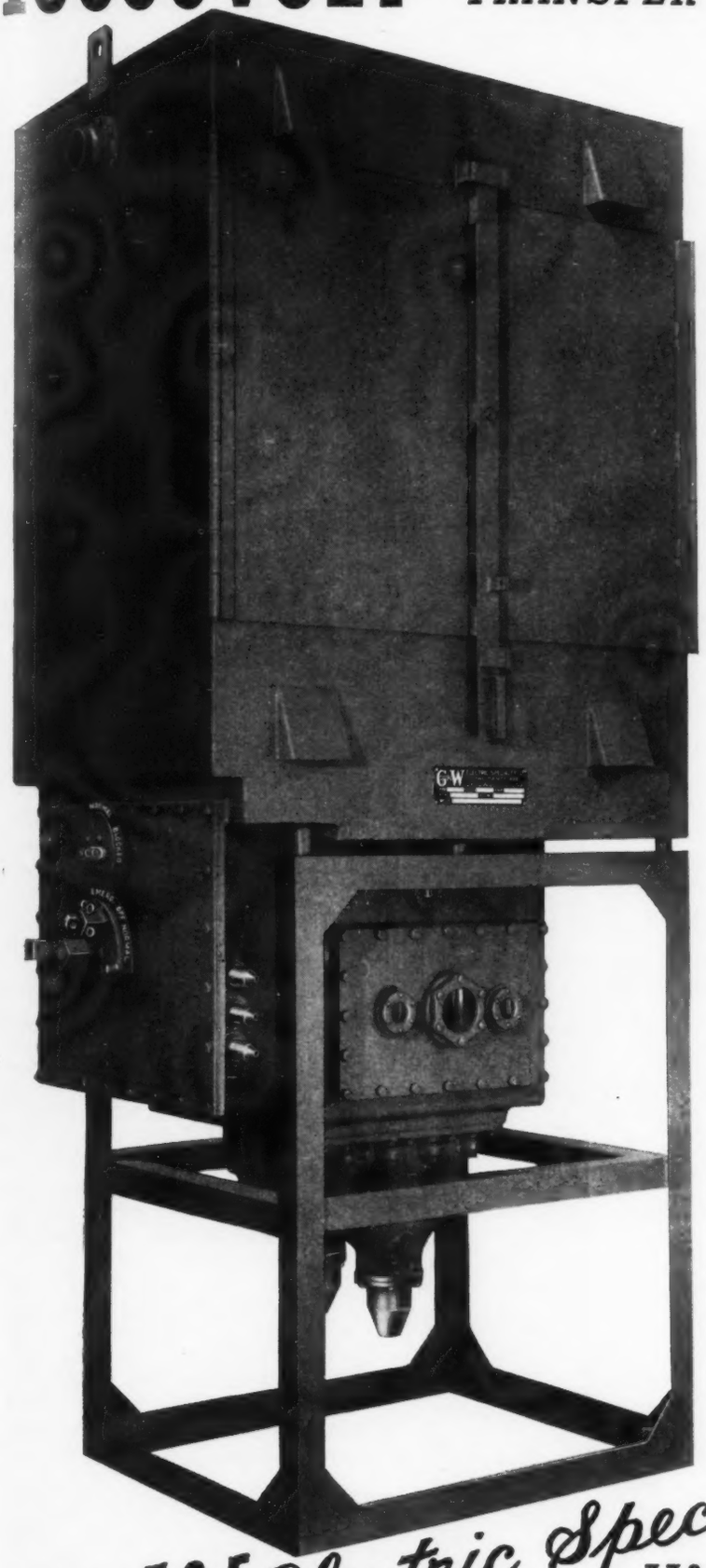

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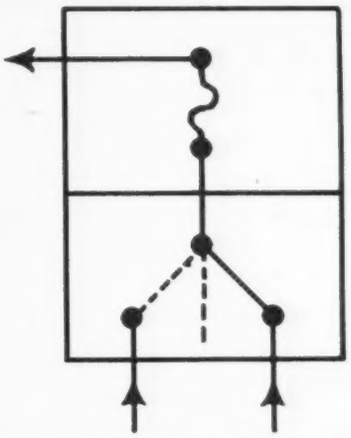
UNITS PROVIDE AUTOMATIC THROWOVER FROM NORMAL TO EMERGENCY FEED UPON FAILURE OF VOLTAGE ON THE NORMAL. MANUAL THROWBACK FROM EMERGENCY TO NORMAL FEED, MANUAL RESET OF MECHANISM.



Glass windows permit visual inspection of switch link positions. Feed cables terminate in potheads on bottom. Load outlet bushings within air filled compartment which encloses fuses. Connections to transformer through conduit on either side or back of top compartment.

It will pay you to investigate the possibilities of G&W Type "FRDA" Units for your distribution system. They are simple, practical and relatively inexpensive. They are made in the particular form that best fits local installation conditions.

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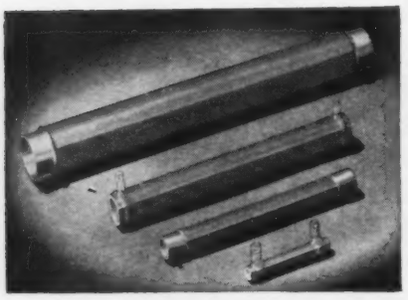

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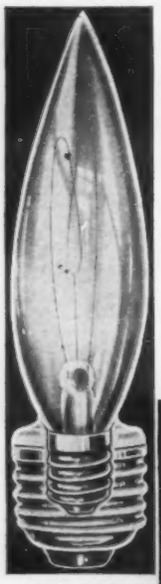

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UTILITY OCCUPATION TAX PROPOSED AT PORTLAND

An ordinance requiring all intra-city utilities to pay an occupation tax on city-earned revenues has been proposed at Portland by Commissioner Dorothy McCullough Lee. If adopted, the ordinance would equalize levies on utilities and add almost $370,000 to city funds.

According to Commissioner Lee, the Portland utility franchise system now places tax loads on some utilities and allows others to operate virtually free of tax on gross revenues. She cited as an instance the fact that revenue from Northwestern Electric Co., based on 3% of gross revenue, amounted to $120,265 last year, while Portland General Electric Co. paid no such tax.

Arizona Court To Test Rate Survey Appropriation

Arizona's supreme court will pass on validity of referendum petitions asking that the $50,000 legislative appropriation for survey of utility rates be referred to the voters in the November election. A 135-page brief has been filed with the court by the state attorney-general and a reply is expected in June.

The petitions have been upheld by the Maricopa County Superior Court. In advising the secretary of state to declare the petitions invalid, the attorney general ruled the appropriation necessary for maintenance of a state department.

● REDUCTIONS in electric rates for Lake Tahoe and Truckee areas amounting to $16,500 annually in California have been announced by the Sierra Pacific Power Co., with the combined reduction for both California and Nevada customers in excess of $20,000 a year. The schedules have been approved by the Nevada public service commission and the California railroad commission.

● NEW RATE SCHEDULES have been put into effect by Public Service Co. of Colorado. For 3,655 domestic customers, the reduction will be $15,059 annually, or 10.43%. For all types of users, annual reduction will be $34,775 or 11.14%.

● RESIDENTIAL AND COMMERCIAL customers of Southern California Edison Co. in Los Angeles will save approximately $1,000,000 annually under new rate schedules effective June 1. On Sept. 1, another reduction, amounting to approximately $725,000, will effect these and other classes of service.

THE LABOR CRISIS
—it's up to Congress

IT HAS remained for John L. Lewis to demonstrate conclusively that, under the sponsorship of the federal government, the power of organized labor has been built up to a point where it can be used to paralyze the economic life of the nation. Therefore, in the elemental interest of self-preservation, the first order of the day is to cut down the power of organized labor to a point where irresponsible leaders no longer have the power to use it to cut down the country.

This will prove an exceedingly complicated job. The federal government, over a dozen years, has developed and buttressed the power of organized labor by many separate steps. They are interlaced in a pattern which cannot easily be unravelled.

Cutting down the power of organized labor to proper proportions will be an operation almost as delicate as brain surgery. To be successful it must impair no basic American political or economic right. It must leave intact the right of workers to organize and bargain collectively through representatives of their own choosing. It must leave intact the right to strike. But it must disassociate from the exercise of these rights opportunities for devastating abuse of the public welfare such as those demonstrated by Mr. Lewis. A meat axe is not the instrument for this operation.

Because of the complexity and delicacy of the operation to be performed it would be helpful if it could be carried out in a tranquil atmosphere. The urgency of the problem is such, however, that no time can be lost in getting at it.

Guiding Principles

However, the dangers that haste or heat will lead to serious blunders can be largely eliminated if the process of bringing the power of organized labor back within safe and reasonable bounds is governed by principles to which all fair minded people can fully subscribe.

The most important of these principles is that it is an abuse of public authority to extend special privileges to organized labor.

When in 1935 Congress passed the Wagner Labor Relations Act, one of the great buttresses of the power of organized labor, it was upon the explicit theory that organized labor was weak and needed coddling by the federal government if it were to survive, let alone grow big and strong. In the policy section of that act it was stated that "the inequality of bargaining power between employees who do not possess full freedom of association or actual liberty of contract, and employers who are organized in the corporate or other forms of ownership association substantially burdens and affects the flow of commerce . . . "

Regardless of whether or not that was a correct reflection of the situation in 1935, it bears no relation to the situation today. Under the continuous sponsorship of the federal government, the power and bulk of organized labor has waxed until today it is preposterous to regard it as the weak sister in its bargaining with employers. If, after being continuously demonstrated since V-J Day, the proposition that the pendulum of organized power has swung too far over on the side of organized labor needed any final and clinching demonstration, John L. Lewis provided it.

Changes in the Law

Translation of the principle that organized labor is no longer a weakling, requiring a diet of special privileges, into specific legislative enactments is a detailed technical operation beyond the scope of this statement. It is possible, however, to indicate some of the general lines it should follow. Here they are:

1. The duty to bargain collectively, now imposed upon employers by the Wagner Act, should also be imposed upon the leaders of organized labor who are now under no legal compulsion to bargain.

   For well over a month Mr. Lewis made a complete mockery of the process of collective bargaining by refusing even to state his demands until the coal operators had approved "in principle" a plan for a miners' "health and welfare" fund which he fancied. In the meantime the country was plunged into an ever deepening crisis.

2. Unions, as well as employers, should be made liable to suit for damages for breaking their collective bargaining agreements.

   A degree of responsibility commensurate with their age and power requires that unions be liable, to the extent of union funds but not the funds of individual members, for carrying out their agreements. To have it otherwise is to hold that a collective bargaining agreement is, by defi-

nition, a phoney agreement so far as the union is concerned. Outlaw strikes are the fruit of this lop-sided arrangement.

3. Employers should be given more discretion, in reinstating employees who have gone on strike than is now permitted by the Wagner Act.

The Wagner Act largely eliminates the risks involved in striking because of the requirements it imposes upon employers to take workers back when they have decided to return to work. These requirements make it virtually impossible for the employer to replace workers even if they are engaged in the most unjustifiable of strikes. At the least workers who have smashed up property and stirred up violence in the course of a strike should have no rights under the Wagner Act. How much further the Wagner Act strait-jacket should be loosened at this point should be carefully explored, and excesses encouraged by the Act should be removed.

4. The wedge which the National Labor Relations Board has driven into the orderly conduct of American industry by holding that foremen are covered by the Wagner Act should be eliminated.

The issue involved here is continuously mislabelled and confused as that of the right of foremen to organize. There is no question of the right of foremen to organize any kind of a legal organization they desire. That is their right as American citizens. The issue is whether or not the special privileges accorded by the Wagner Act, which in some circumstances has been so construed as even to prevent employers from talking with their workers, should be extended to foremen who, if American industry is to have a chance to do its duty effectively, must represent management with full loyalty and responsibility.

A member of John L. Lewis' United Mine Workers takes an oath which provides, in part, "that I will not reveal to any employer or boss the name of anyone a member of our union" and will "defend on all occasions and to the extent of my ability the members of our organization." Mr. Lewis insists that the coal operators contract to deal with foremen to be organized in a union where they will take that oath, and where their activities will be separated from the influence of employers by the barriers imposed by the Wagner Act. Such an arrangement undercuts orderly management of American industry.

5. The exemption of labor unions from the federal anti-trust laws, provided when organized labor was presumed to be weak, should be modified to take account of its vastly increased strength, and the use of this strength to destroy business enterprise and create monopoly.

As matters stand unions can run employers completely out of business by secondary boycotts and run fellow workers out of jobs in the process. An Ohio manufacturer, working with a government-certified C. I. O. union, is put out of business because A. F. of L. workers refuse to handle his products. Still the government, this time in the person of the United States Supreme Court, says that actions of this sort are above the law because Congress exempted unions from the federal anti-trust laws.

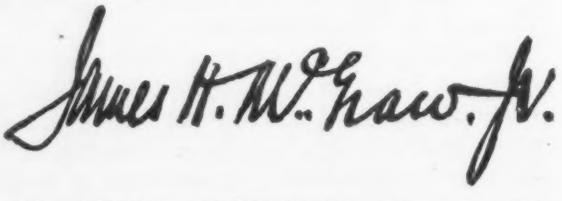
To eliminate one of the most devastating forms of restraint of trade, this exemption should be cut down forthwith by subjecting unions imposing secondary boycotts to the same penalties under the federal anti-trust laws as those to which employers doing the same thing are subjected. And the question of further narrowing the obsolete exemption of unions from the federal anti-trust laws should be fully explored.

6. The levying of special sales taxes for the exclusive benefit of unions should be prohibited by law.

As a matter of good government the right to levy consumption taxes should be reserved to the public authorities and used strictly for public purposes. As a matter of good economics, payments to workers or their organizations should be included in the payroll where they can be properly counted as part of the cost of production.

Equality Before the Law

When everything that can conceivably be accomplished by legislation has been accomplished there is no reason to believe that an ideal or even a surely workable system of industrial relations will have been devised. Many of the mainsprings of such a system lie deep in the hearts of men and far beyond the reach of legislation. There is no chance, however, of having such a system, or even a defensible system of democratic government until special privileges which tip the scales of power far on the side of organized labor are withdrawn and there is some measure of equality for employers and organized labor before the law. Though it is hard to believe it at the moment the country may come to be grateful to John L. Lewis for driving that lesson home so ruthlessly.



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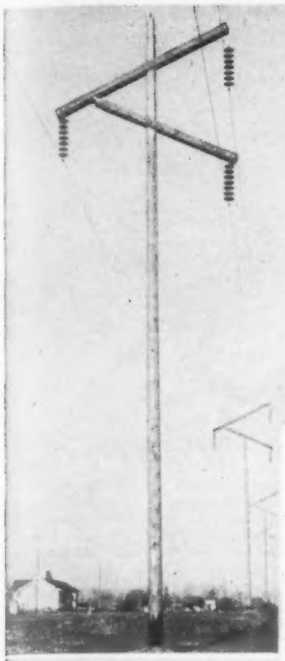


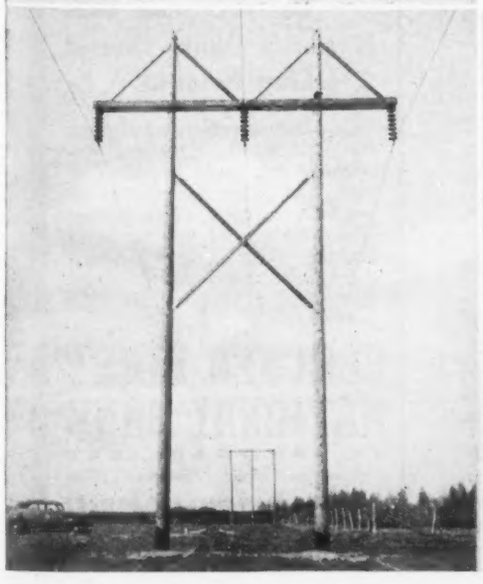
HUGHES BROTHERS have endeavored to bring to the Utility Industry, transmission and distribution materials of unequaled quality, economy, and dependability. The same research technique and testing that developed the first "HUGHES" Wood X-Brace has been included in the many items we now manufacture.

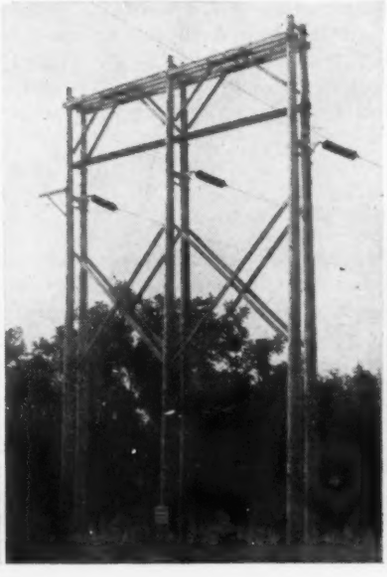
HUGHES BROTHERS will continue, as in the past, to cooperate with Utility Engineers in the development of new ideas and our entire plant facilities are available for the purpose of developing lower cost and more reliable transmission and distribution systems.

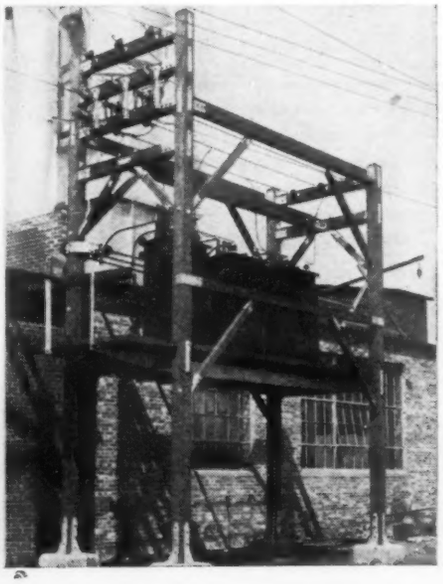
For additional data consult our Engineering Department or write for Catalog No. 10.

MANUFACTURERS OF
Transmission and Distribution Structures
Prefabricated Wood Substations
Wood and Steel Switch Mountings
Transmission Line Hardware
Special Wood Items
Special Steel Items

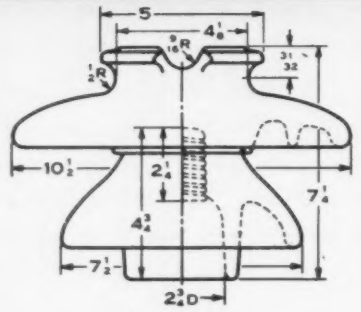
HUGHES BROTHERS
SEWARD NEBRASKA







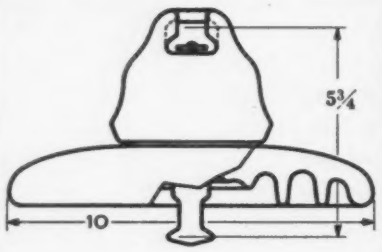
THOMAS
PORCELAIN
INSULATORS



NO. 2124-M
45 Kv. Rating

Dry Flashover	125 Kv.
Wet Flashover	85 Kv.
Rec. Pin Height	8 In.
Std. Pkg. Crate	6

This insulator generally used on 33 Kv. can also be furnished in one-piece design (No. 1924). Mechanical, thermal and electrical characteristics are well balanced insuring long life in service.



NO. 21243
15,000 Lb. Min. Combined M. & E. Rating

Dry Flashover	80 Kv.
Wet Flashover	50 Kv.
Leakage Distance	11½ In.
Std. Pkg. Crate	6

This design is offered in a wide range of spacings in both Ball-Socket and Clevis types which fulfill all strain insulator requirements.

● Service records prove these units will serve faithfully under all conditions. Call our nearest sales representative for speedy delivery.

WESTERN REPRESENTATIVES

Los Angeles	R. E. Cunningham & Son
San Francisco	Geo. E. Honn Co.
Seattle	Ken H. Best
Phoenix	J. E. Redmond Co.
Denver	R. F. Hamilton & Assoc.

THE R. THOMAS & SONS CO.
LISBON, OHIO

DEPARTMENT BOOKLET LISTS INDUSTRIAL ADVANTAGES

To sell the industrial advantages of southern California to eastern and middle-western prospects for industrial plants, the Department of Water & Power, Los Angeles, has issued a 40-page brochure titled *F.O.B. Los Angeles*. The book is offered to industrial executives who write for it, responding to a national advertising campaign in a list of business and trade magazines of national circulation. The book presents facts and figures concerning the Los Angeles area not quite as well known as its climate. It compares the area with other industrial sections of the country, gives the figures as to its labor supply, points to the availability of sites for industrial plants, indicates its specific markets, treats of the climate and other contributing attractions for a labor market, gives facts regarding the water supply and power supply, lists raw materials available, metals available, transportation, airways, waterways, and points to opportunities for manufacture of products not now made there.

B. C. Electric Gets Permit For Bridge River Projects

Official approval has been given by the British Columbia government to proposals of the British Columbia Electric Railway Co. to develop the initial unit of its Bridge River power scheme. The government's order lists the following projects: Installation of one 62,000-hp. hydroelectric generating plant; construction of the first portion of a power house with settings for three machines; construction of a diversion dam at site No. 7, just below the present tunnel intake; miscellaneous work at the Seaton Lake end of the tunnel; construction of a penstock from the tunnel to the power house site; necessary low-voltage switching equipment with auxiliary equipment and transformer capacity to step up the voltage for transmission to Vancouver; one transmission line to be carried on steel towers from Bridge River to Vancouver.

● First Formal Application for power when available from Anderson Ranch Dam, now being constructed on the South Fork of the Boise River, has been submitted to the Bureau of Reclamation by the Prairie Power Corporation Inc., Fairfield, Idaho, R. J. Newell, USBR regional director, announced recently. The application calls for delivery of 100 to 300 kw. of energy to the cooperative at a point near the project power plant.

ALL KINDS
of SMALL
TRANSFORMERS

—in the JEFFRIES line

Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformers to exactly match your requirements. If not in our regular line, we build to meet your specifications—in a hurry!!

Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles 11, Calif.

Pay Bills the Easy Way!

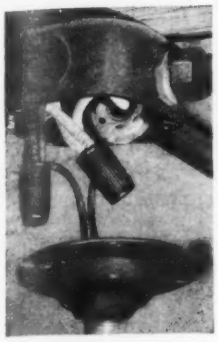
Use a Crocker First National Bank Special Checking Account

Enjoy the convenience and prestige of a Special Checking Account of this bank. It's simpler, safer and more businesslike to pay bills by check. The only cost is for the checks you buy — in books of 10 for $1 — as you need them. Open an account today and then use our Mailway Banking Service.

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank
ONE MONTGOMERY STREET
Member Federal Deposit Insurance Corporation

IDEAL HOUSE WIRING SPECIALS

"WIRE-NUTS"

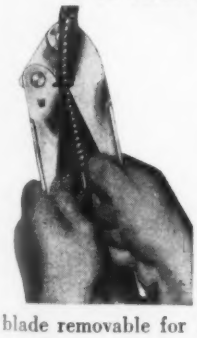


For hundreds of various house and other wiring jobs, IDEAL wire connectors provide the modern way to make quick, safe, easy and lasting joints. They are easy to use—you simply (1) strip wires, (2) screw on—that's all! And, you have a wire joint that's better electrically, stronger mechanically. They eliminate the fuss and bother of old fashioned solder-and-tape and blow-torch methods. All you need is a wire stripper and a pocketful of "Wire-Nuts." Made in five sizes for all solid and stranded wire combinations from 2 No. 18 to 3 No. 10. FULLY APPROVED. Millions in use!

FISH TAPE, REEL AND PULLER

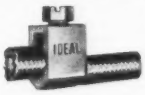
No more worry about Fish Tape getting loose and springing all over the floor. With the IDEAL Fish Tape Reel, it is easy to pull tape through conduit quickly. While the coil of steel tape is held securely in the reel at all time, it can be instantly and quickly run out to any length, with constant tension on the wire being maintained—no kinks, bends or breaks.
The Fish Tape, Reel and Puller is three tools in one; belongs in every Electrician's Kit along with pliers, cutters and screw driver. Made in 8 convenient sizes.

B-X ARMOR CUTTER



B-X cable (either two or three wire, No. 12 or No. 14) is easily and quickly cut in one snip with this handy new pocket size tool. The B-X Armor Cutter eliminates antiquated, dangerous hack saw methods. This tool cuts cleanly, without injury to insulation. Has a special steel cutting blade removable for sharpening.

SERVICE ENTRANCE CONNECTORS



Especially efficient for making connections between service drop conductors and house entrance leads. The body is made of cold drawn copper; the screws of Everdur. These service entrance connectors take wire Nos. 2 to 10 stranded, and No. 12 solid. Easily applied with a screw driver or pliers.

"SCREW-TITE" SOLDERLESS LUGS

Can be quickly and securely attached with either screw driver or wrench. "Screw-Tite" Lugs require no solder—no special application tools.
Made of seamless electrolytic copper, accurately pressed for uniform size. Heavy brass, checkproof shell reduces heating. Flat contact surfaces assure minimum resistance, with full carrying capacity evenly distributed from wire to lug. There is no metal cut away to reduce capacity. Made in 8 sizes for No. 14 wire to 2,000,000 CM cable (35 to 1050 amps.) Special "Screw-Tite" Lugs are available.

CABLE RIPPER

Cuts non-metallic sheathed duplex cable or lead covered cable—cleanly, quickly, easily, in one simple operation. Case hardened cutting point provides positive, clean ripping by simply squeezing cable ripper on cable and pulling.
Can also be used for ripping outer sheathing of other cords, lead cables, etc., where outside diameter is not greater than ⅝". Overall length 3¾"—weight 2 ounces.

WIRE AND CABLE REEL

Easily hangs anywhere—from joist, pipe beam or wherever it is handy, giving the workman complete control of coiled wire or cable. Steel frame is designed with one part of the frame smaller than the other, so that when Reel is folded it requires no more room than an ordinary coat hanger. A finger locking device holds Reel open or closed. Handles practically any type of coil from 3" to 14" inside diameter, insulated wire from No. 18 to No. 2, electrical cord, rope, armored cable, romex, binding, etc.

SPLIT BOLT CONNECTORS

These new IDEAL Split Bolt Connectors are made of either high quality bronze, brass or aluminum. They have precision contact surfaces, to produce maximum conductivity. They are used for permanent or temporary solderless connections.
Available in Two Types—"one piece" and "two piece" with small or large heads. On the "one piece" type a flexible link permits universal movement of the nut. The nut swings entirely clear of the slot, eliminating interference with wires during installation.

JOIST BORING MACHINE

No more climbing up and down ladders, no more back breaking stooping or straining. This IDEAL Joist Boring Machine bores through rafters, joist or studding up to height of 11 feet or bores below floor level. Bit locks into position with a knurled collar. Weight 11 lbs. The joist borer is now available "knocked down," without pipe, to assemble on the job. Either standard ½" pipe or conduit can be used.

"E-Z" WIRE STRIPPERS

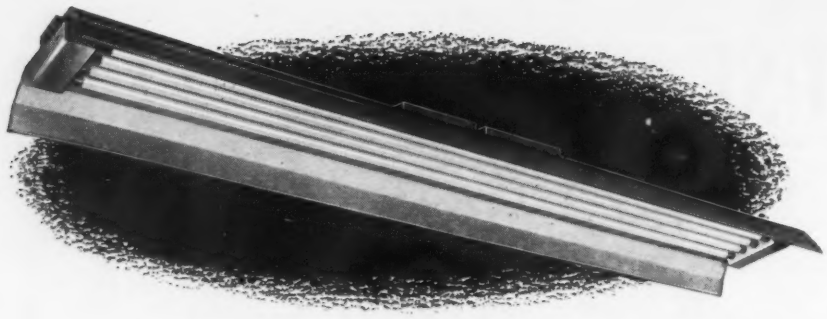
Here is a handy wire stripper. Pocket size, only 7½ inches long—weight 24 ounces. "E-Z" Wire Strippers come in 2 models. "Automatic" and "Standard."
Operating on the triple action principle, the "Automatic" model clamps the wire, cuts insulation and strips it, all in one simple operation. A lever stops the return of the arms until the wire is removed, after stripping. Strips stranded wire but can be used equally well on solid wire.
"Standard" Model does not have "return lever." It is particularly suited for stripping solid wire, but can be used for stranded wire. Five sizes strip No. 30 to 8 gauge—solid or stranded wire.

SOLD THROUGH ELECTRICAL WHOLESALERS

IDEAL INDUSTRIES, Inc.

Successor to Ideal Commutator Dresser Co.

1042 PARK AVENUE **SYCAMORE, ILLINOIS**



*COLOVOLT COLD CATHODE INDUSTRIAL FIXTURES

Here is the new Colovolt industrial fixture, one of a complete line of industrial and commercial "packaged" units. Equipped with the standard 93" Colovolt 10,000 hour lamp, Colovolt fixtures may be used singly or in continuous line lighting in multiples of 8 feet. Instantaneous starting, no flickering, guaranteed for 1 year except for failure due to breakage are extra advantages of the Colovolt Cold Cathode low voltage fluorescent lamp. The long life expectancy of Colovolt lamps may be realized even when constantly turned on and off, and *pre-scheduled re-lamping, with no loss of production or time, is now possible with Colovolt installations.*

*Trade mark registered U. S. Pat. Off.

Contact your electrical wholesaler or jobber, or write us for full details and prices.

GENERAL LUMINESCENT CORPORATION
670 S. FEDERAL STREET CHICAGO 5, ILLINOIS

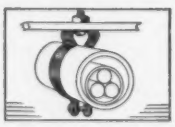
MINERALLAC

COMPOUNDS
Insulating and Cable-pulling

Complete assortment; insoluble in oil and water; high and low voltage; all temperatures; dense, viscous, fluid, for Cable-Joints, Potheads, Terminal Belts.

Steel HANGERS
Cable and Conduit . . . Messenger

In Cadmium-plated Steel and Everdur. All sizes. Insulating Bushings supplied. Top quality. Permit quick wiring.

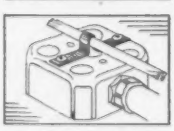


Steel JIFFY CLIPS
Pipe-clamp, only one nail or screw required

For hanging pipe, conduit, BX-cable, etc. Rib adds strength. Light weight, streamlined. All sizes. Millions in use. In cadmium-plated Steel and Everdur.

Steel STRAPS
Messenger; for outlet-boxes

Cadmium-plated Steel or Everdur. Use in conjunction with Minerallac Messenger Hanger. Fit all standard outlet-boxes and ⅜" cable.



Write for new literature and prices.

Walter E. Brand Company, 1855 Industrial St., Los Angeles, Cal.
G. E. Honn Company, 420 Market St., San Francisco, Cal.
Truman S. Groves, 615 Dearborn St., Seattle, Wash.
F. D. Ostermueller, 6935 Meadow Lake Ave., Dallas, Texas
Mountain States Machinery Co., 1526 Blake St., Denver, Colo.

Volt-telling STATISCOPE

Indicates live electrical fields. Protects workers. Pocket, Sub-Station and Overhead styles. Many uses. Top-quality.

MINERALLAC ELECTRIC COMPANY
21 North Peoria St. Chicago 7, Illinois

PEOPLE
made this news

● HERBERT METZ, assistant manager of the Metropolitan district of Graybar Electric Co., was awarded the 1945 Wholesaler's medal given under the James H. McGraw award. Presentation was made during the NEWA annual meeting at Chicago April 23. Metz was given the award for his work in planning the program for re-employment of returning veterans. Harry E. Perl, State Electric Supply Co., Oakland, Calif., was a member of the Committee of Awards.

● L. T. (Don) OWEN, for the past nine years a member of the sales and engineering staffs of Hubbard & Co.'s Pacific Coast division, has been appointed sales engineer for the company's Northwestern territory, consisting of the states of Oregon and Washington. During the War, he flew the Aleutians as a radar man in the Navy's PBY's, and was commissioned in the field while on active combat service. At the time he was in the Aleutians, there was little between the Japs and the United States except the PBY's.

● AMONG eighteen recipients of meritorious awards of $50 each in the Sylvania commercial fixture design contest were: R. B. BRANUM, Pacific Gas and Electric, Fresno; L. B. CRAIG and D. R. KEEBAUGH, PG and E, Oakland; LADNER V. ROSS, Washington Water Power Co., Spokane; C. M. J. WOOD, PG and E, San Francisco.

● RAY JONES, Denver distributor of appliance and washing machine parts, is a member of the board of directors of a newly formed association of washing machine parts jobbers which held its organization meetings in Des Moines recently.

● THREE RETURNED VETERANS have been named to the staff of Kelly's Appliance Center in Portland: R. T. WARD, manager; WILLIAM H. ARDISS, small appliance manager; B. R. HUFF, service manager.

● J. E. LONG has been appointed electrical inspector at Torrance, Calif., succeeding O. C. Butterfield, who resigned recently to devote full time to the ministry.

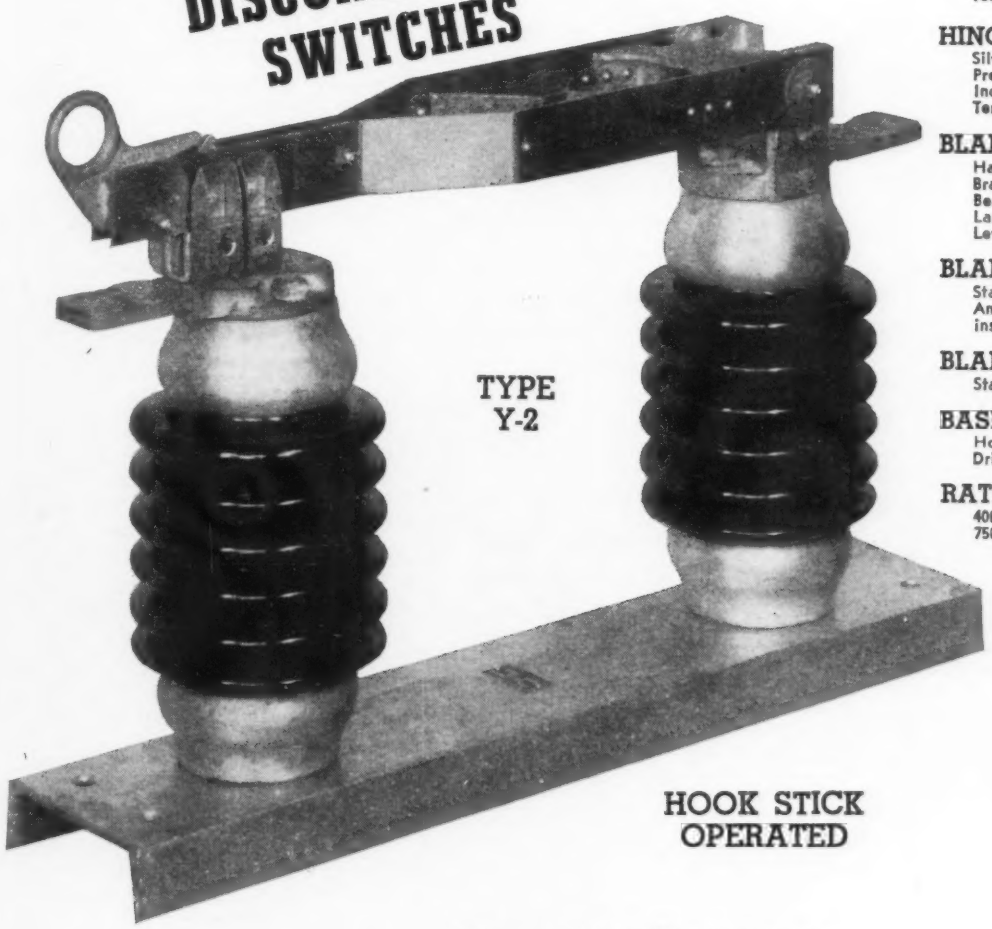
● LARRY TRIM, electrical inspector at Burbank, Calif., has recently returned from the armed forces and resumed his position.

Cole Electric Co.

1510 So. Los Angeles St. Los Angeles (15), Calif.

PRospect 2068

DISCONNECTING SWITCHES



TYPE Y-2

HOOK STICK OPERATED

CLIP END CONTACT
Pressed Copper Shoes
Silver to Silver Contact
Self Aligning
Short Current Path
Individual Stainless Steel Springs
Terminals 1¾" Drilling

HINGE END CONTACT
Silver to Silver
Pressure maintained by Individual Spring Washers
Terminals 1¾" Drilling

BLADES
Hard Drawn Copper
Braced by X Copper Straps
Bearing Yoke at Hinge End
Large Pull-out ring
Leverage pryout

BLADE STOPS
Standard Equipment
Angle can be changed after installation, if necessary

BLADE LOCKS
Standard Equipment

BASES
Hot Dip Galvanized
Drilled to specification

RATINGS
400 to 6000 Amperes
7500 to 161,000 Volts

Power Plant Equipment

AIR BREAK SWITCHES MANUALLY OPERATED
AIR BREAK SWITCHES MOTOR OPERATED
DISCONNECTING SWITCHES
BUS AND CABLE FITTINGS
BUS AND CABLE SUPPORTS
FUSE MOUNTINGS, FUSES
SWITCHBOARDS
INDUCTION RELAYS

Pacific Coast Representatives

EICHER & BRATT
Colman Bldg.
Seattle (4), Washington
Eliot-2722

EARL S. CONDON CO.
357 So. Hill St.
Los Angeles (13), Calif.
MI-2831

JOBBERS' PROFITS GROW FROM WORLD-WIDE *Preference* FOR

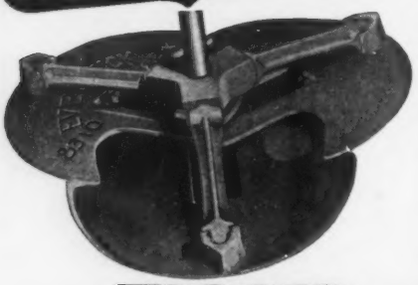
Lenk

Soldering Irons
Solders
Blotorches

THE *Lenk* MFG. COMPANY ★★★
NEWTON LOWER FALLS 62, MASS.
★★ *Manufacturers of Soldering Equipment Since 1919*

Lenk set a standard in quality production many years ago. Others have copied, but few have equalled Lenk in value, quality, dependability.

EVERSTICK ANCHORS...



FOR *SPEED* IN INSTALLATION

The exclusive Everstick nut housing locks the Anchor firmly on the rod. This speeds up installation. Plates are so designed, that they expand easily into undisturbed earth, and extra holding power is achieved. Made of tough, rust-resistant malleable iron. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

GET ACQUAINTED WITH SCHWEITZER & CONRAD'S TYPE SLB LOAD INTERRUPTER SWITCHES

More than six years of field operating experience has proved S&C Type SLB Load-Interrupter Switches to be reliable, economical devices for:

1. Loop circuit sectionalizing.
2. Disconnecting capacitor banks.
3. Isolating transformer banks.
4. Isolating plant feeders.
5. Interrupting exciting current of feeder regulators.
6. Throw-over from preferred to emergency circuits.

When combined with S&C Power Fuses or Distribution Cutouts they provide in addition:

7. Substation protection and switching.
8. Sectionalizing and protection of branch distributing feeders.
9. Short circuit protection on primaries of industrial customer substations.

SEND US YOUR INQUIRIES

GEO. E. HONN CO.
420 Market Street San Francisco, Cal.
Phone SUtter 7352
San Francisco Correspondent of Schweitzer & Conrad, Inc.

Browne

● A. A. BROWNE has been appointed general manager of Pacific Electric Mfg. Corp., San Francisco, according to J. S. Thompson, president. Brown formerly was manager of engineering and sales for the Joshua Hendy Iron Works at Sunnyvale and before that was general manager of Pomona Pump Co. At one time he was with Westinghouse in San Francisco, as assistant central station department manager.

● CHARLES O. WOODWORTH has returned to Public Service Co. of Colorado and is street lighting engineer in the Denver commercial lighting department. He replaces Joseph I. Wright, resigned. Woodworth left the company about 15 years ago to become associated with the late Frank S. Peterson in the design and installation of the airport lighting system at Denver municipal airport. For about six months before his return to the company, he was with a Denver electrical firm as lighting engineer.

● KENNETH H. BEST of Seattle has been appointed representative for Keystone arresters of the Electric Service Supply Co., in Washington, Oregon, Idaho and western Montana, and for dynamometers and test equipment of the W. C. Dillon Co. in Washington and Oregon.

● CHARLES A. SCARLOTT of Pittsburgh, manager of engineering publications for Westinghouse Electric Corp., visited the West last month, speaking before engineering groups.

● DEL DICKSON, former managing editor of the National City *News* near San Diego, is the new editor of San Diego Gas & Electric Co.'s employee magazine, the *News Meter*.

● H. E. JOHNSON has been made operating manager of the Los Angeles appliance distributing branch of General Electric Co.

WEBSTER ELECTRIC intercommunication systems, paging and sound systems offer profitable sales possibilities

Teletalk is a Time Saver

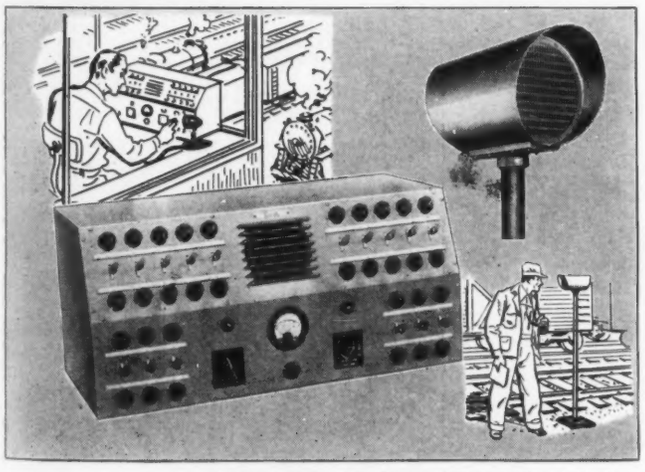
Offices, factories, garages, small stores, practically all businesses can use "Teletalk" intercommunication systems to advantage. They make it possible to have a person-to-person conversation without leaving your desk—without dialing—without waiting—all you have to do is flip a key and speak into your "Teletalk." This time saver saves its own cost in a reasonable length of time. Practically every company is a prospect.

Illustration shows Model No. 512 SL

Telepage is Convenient in Locating Personnel in Office or Plant

"Telepage" is widely used to supplement phone service and eliminate "running around," trying to locate personnel in office or plant. With speakers conveniently placed, individuals can be paged quickly to answer phones or to receive messages. When installed at switchboard it proves a worthwhile addition to any business.

Illustration shows Model No. 10124



Telespatch for Dispatching in Rail Yards and Sheds

"Telespatch" offers the opportunity to give personal voice instruction to yard crews in rail yards or train sheds. Banks of long-range paging speakers can be placed at intervals or individual speakers at important locations. This offers an opportunity to have personal voice supervision to speed loading, unloading and handling of freight, making up trains and control of switching operations in classification yards and train sheds.

Illustration is of a 20 Station Model

Licensed under U. S. Patents of Western Electric Company, Incorporated and American Telephone and Telegraph Company

WEBSTER ELECTRIC

RACINE WISCONSIN

Established 1909

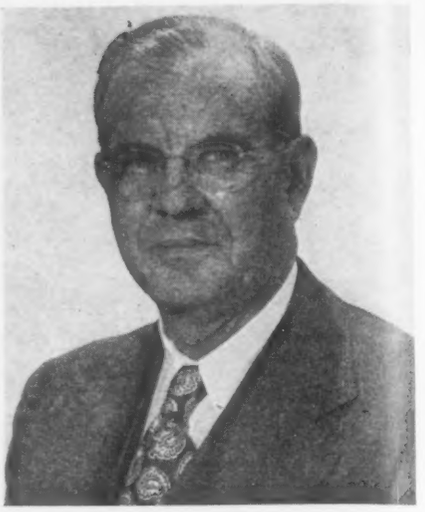
Export Dept. 13 E. 40th Street, New York (16), N. Y. Cable Address "ARLAB" New York City

"Where Quality is a Responsibility and Fair Dealing an Obligation"

● D. D. SMALLEY on July 1 will take over as engineer of electric operation for Pacific Gas and Electric Co., succeeding Fred R. George, who retires after 45 years with the company and its predecessors. Smalley, who since 1944 has been central area superintendent, started his career in 1911 with the Merced River Co., which later merged with the San Joaquin Light and Power Corp. For ten years he was general superintendent of the San Joaquin and Midland counties systems of Pacific Gas and Electric.

● FRED R. GEORGE, who retires on July 1 as PG and E engineer of electric operation, started with the electric industry in 1901, after graduation from the University of Southern California. His first job was oiler and operator in the San Francisco plant of the Mutual Electric Light Co., which later merged with PG and E. One of his notable accomplishments was the central load dispatching system, which he worked out in 1906. He has been engineer of electric operations since 1921.

● G. H. HAGAR will succeed D. D. Smalley as Central Area superintendent for PG and E. He has been Smalley's assistant.

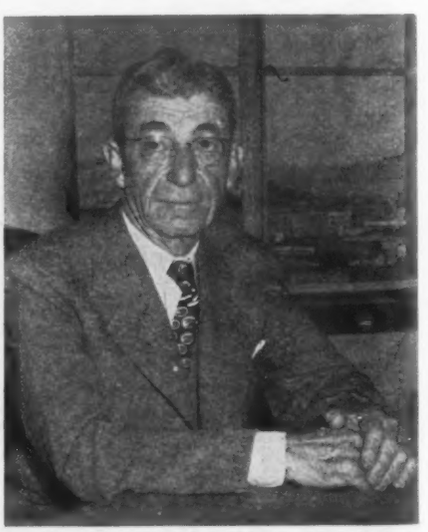


Smalley

● PACIFIC GAS AND ELECTRIC has announced the following shifts in district administrative personnel: GEORGE V. FOOTMAN has been moved from Santa Maria to Kern district as manager; EDWARD C. GILL, former Tracy district manager and, since his discharge from the Army as lieutenant colonel of engineers last December, an assistant to A. Emory Wishon, succeeds Footman at Santa Maria. O. R. EVANS, Humboldt division manager, will go to the San Francisco Bay area and will be succeeded by GEORGE L. WORKS, sales manager of the San Jose division. DOUGLAS S. AIKEN, sales manager of the Shasta division and recently retired as Navy lieutenant, will replace Works at San Jose.

● HAROLD K. FOX, manager of the Kern district of Pacific Gas and Electric Co. since 1937 and for 27 years with the company, has been appointed engineer of steam plant construction in the general construction department at San Francisco.

George



OUR NAME MAYDWELL SPELLS QUALITY

MAYDWELL & HARTZELL
INCORPORATED

Engineers and Factory Distributers

ELECTRICAL
Transmission
Distribution
Communication
LINE EQUIPMENT

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NOW YOU CAN "Hang the Sky" TO HELP THEM SEE BETTER

Over-ALL Lighting

by Wakefield

Let the STAR provide a sky of easy-eye light

Here's the answer for many of your customers. Provides all the advantages of both fluorescent and indirect light *plus simple, sturdy construction and easy maintenance.* Checked and improved by pre-testing. Unusually simple to handle and clean—Plaskon reflector section slides out like a drawer. No need to take unit apart. Ideal for office, drafting room or school. Ask for details.

It's new — THE WAKEFIELD STAR

Helps you build commercial LIGHTING LOAD

Over-ALL Lighting by Wakefield provides a new method for lighting office interiors, drafting rooms and schools. A method that makes for easier seeing *and for more business for you!*

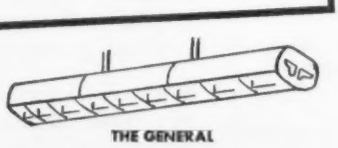
Designed to protect eyes against strain, the new Wakefield Over-ALL Lighting method spreads soft pleasing light *over all.* Your customers will like it because this new system is based on lighting results which mean comfort plus efficiency.

And especially important to you—Wakefield equipment for Over-ALL lighting has been designed to simplify your job . . . since easy installation, easy maintenance and long-lasting service *in addition to top lighting performance* makes selling easier.

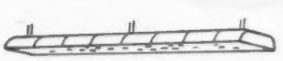
Ask your Wakefield representative to tell you how Over-ALL Lighting can work for you. The F. W. Wakefield Brass Company, Vermilion, Ohio.

Wakefield

LIGHTING EQUIPMENT FOR OFFICE, SCHOOL AND DRAFTING ROOM



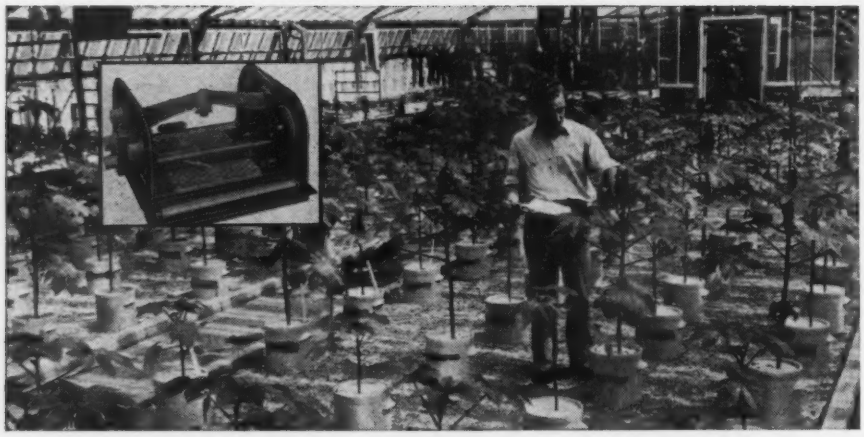
THE GENERAL



THE GRENADIER

THE COMMODORE

THE DIPLOMAT



TURN ON THE HEAT *when and where you want it . . . with NICHROME

From keeping aerial cameras warm in the stratosphere to protecting delicate roots underground, Nichrome heating elements have been impressed into service to deliver dependable heat . . . wherever and whenever it is required. Because the vital factor of dependability leaves no room for compromise Nichrome has been specified for more new electrical heating applications.

than any other alloy resistance wire.

Although there are several excellent Nickel-Chromium combinations there is only one NICHROME and it is made only by Driver-Harris. For improved performance in your new products, specify Nichrome and other resistance alloys by Driver-Harris. Tell us what you need.

*Trade Mark Reg. U. S. Pat. Off.

Driver-Harris COMPANY

Stocked for the Coast Trade at **ANGUS - CAMPBELL, INC.**

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Main Office and Plant: HARRISON, NEW JERSEY

***ILSCO* ELECTRICAL CONNECTORS**

100% CONDUCTIVITY

Due to the 99% pure electrolytic copper drawn right in our plant from seamless copper tubes . . . even with overload you'll get 100% satisfaction.

Western Distributors: Electrical Specialty Co., Seattle, San Francisco; Strieby & Barton, Ltd., Los Angeles.

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OPERADIO MANUFACTURING CO.
Flexifone Intercommunication Equipment

TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

KNOX PORCELAIN CORP.
Electrical Porcelain

● CAPT. GEORGE D. LAMOREE, son of C. D. LaMoree, manufacturers' representative in Los Angeles, has rejoined his father's business to become a partner after a distinguished career in the Army as operations officer in the 69th Division. C. D. LaMoree says that his son will ultimately assume the position of general manager of the business, which is that of handling plastic materials used in the electrical industry. Besides participating in the capture of Leipzig, for which he was given a Bronze Star, Capt. LaMoree was made Oberschuler, or principal, of a school for enlisted men at Bremen.

● A. T. GOWARD, who retired as vice-president of the B. C. Electric Railway Co. at Victoria, B. C., recently was presented with a combination radio and gramophone and with two recordings of tribute from the employees of the company on Vancouver Island. The presentation was made on the occasion of Goward's seventy-fourth birthday by W. C. Mainwaring, who succeeded him as vice-president of the company, and by President W. G. Murrin.

● A. EDWARD SIMPSON has started an electrical engineering business in Vancouver, with offices at 850 West Hastings St. Simpson was associated with one of the leading electrical contractors in Vancouver from 1928 until he joined the air forces in 1942. He served as an electrical officer with the RCAF and recently received his discharge.

● GERALD L. PICKLE, former business manager for the linemen's branch of Local No. 6, International Brotherhood of Electrical Workers, has been made editor and field representative for the union newspaper, *Organized Labor*, official paper of the San Francisco Building and Construction Trades Council.

● DONALD S. SMITH is now power apparatus sales engineer in the Vancouver B. C., office of the Northern Electric Co. During the war he served with the National Research Council at Ottawa.

● ERIC BRETTELL, managing director of Brettell Electric, Vancouver, is planning to retire from business July 1. He has been engaged in the wholesale electrical business in Vancouver for the past 34 years.

● JACK DREYFUSS is acting manager of General Electric's Los Angeles appliance service center. His appointment followed the death of R. K. Peters.

● FRANK STENTON is now B. C. Electric district representative in Sidney.

● ROBERT B. MCFARLAND, after four years in the U. S. Army, has returned to Washington Water Power Co. at Coeur d'Alene, Idaho, as residential representative. MRS. HARVEY HEMINGWAY has reopened the home service department as home service adviser. Both work under the direction of Gordon Defoe, division sales manager.

● TAYLOR MORAN has arrived in Vancouver to assume his position as vice-president of the B. C. Electric Railway Co. He was vice-president of the Stevenson & Kellogg Ltd., job engineering specialists in the East. During the war he aided in organization of various war agencies.

● A. BARTON, electrical inspector at Culver City, recently returned from the armed services to take up his old position.

● E. E. LARSON, city electrician, Riverside, recently resigned to go into business for himself as an electrical contractor. He is succeeded by HARRY AGER.

Deaths

● WILLIAM REQUA VAN BOKKELEN, consulting electrical engineer, died May 22 at Berkeley, Calif. He was 60 years of age. A 1906 graduate of the University of California, Van Bokkelen was for many years chief engineer of the Coast Counties Gas & Electric Co. In 1939 he headed the electrical department for the Golden Gate International Exposition, and subsequently maintained consulting electrical engineering offices in San Francisco.

● HERBERT C. HAYLOR, 56, manager of the Park City district of Utah Power & Light Co., died April 16 following a four-month illness. An employee of the company for 30 years, Haylor was a graduate of the University of Utah where he received his electrical engineering degree in 1922, and a veteran of World War I.

● R. K. PETERS, 34, who was appointed manager of the General Electric appliance center at Los Angeles in March, died there May 4, following a short illness. He was born in Scotland and came to the United States as a child. He started with G-E in 1929.

● JAMES FLOYD DENISON, 79, died at Orange, Calif., on May 13. Secretary-treasurer for Montana Power Co. from 1925 until 1932, Mr. Denison had retired to California to live. His association with Montana Power had dated from 1910.

SORGEL
AIR-COOLED
TRANSFORMERS

Have Everything

Liberal Design
For continuous hard service.

Interchangeable **single phase units.**
460 or 230 volt primary.
230 or 115 volt 2-wire or 3-wire secondary.

Wall or Floor Mounting
No extra brackets.

Connection Compartment
No junction boxes or extra fittings.

Solderless Terminals
No splicing—No soldering—
No taping.

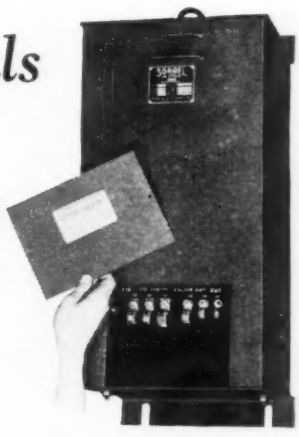
Three-Phase Units
All self-contained.
No complicated connections.

Sizes and Types
For every purpose.

Single phase, poly-phase, phase changing.

Insulating. Auto, Booster.

¼ to 1000 Kva. All voltages.



3-phase Wall Mounting Type. Showing connection compartment with solderless terminals.

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CAMPBELL & GEORGE CO.
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Pioneers in the development and manufacturing of Air-Cooled Transformers

AUSTIN LEVELING BRIDGE FOR SWITCHES AND RECEPTACLES

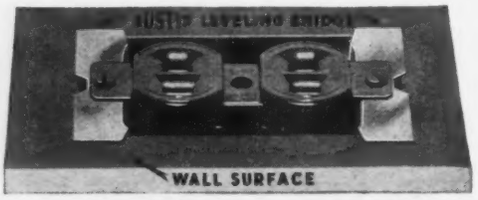
No. 1941

Here is a very inexpensive device that saves time and eliminates all the troublesome problems of leveling switches and receptacles with the surface of the finished wall so that the plates fit perfectly.

It positively eliminates broken or distorted plates and loose switches or receptacles. It is very common to go back to the job to mount the switch or receptacle plates only to find that the box is setting a bit crooked or it is too far back from the wall so that the receptacles do not line up with the plates. The Austin Leveling Bridge completely overcomes this problem.

It rests on the surface of the finished wall and the screws for the switch and receptacle pass through it and into the ears of the switch box. Therefore the receptacle is in perfect alignment for the plate. Ideal for concrete jobs where the boxes seldom come flush.

No matter how far back or how crooked the box may be the Austin Leveling Bridge makes every switch or receptacle fit perfectly with the plate and every plate fit perfectly on the wall. Made for single or two-gang outlets.



Above illustration shows a duplex receptacle mounted on the Austin Leveling Bridge. Note:—Receptacle is flush with wall surface and in perfect alignment for the plate.

ORDER FROM YOUR ELECTRICAL WHOLESALER

Austin Cat. No.	Type	Wt. Lbs. Per 100 Sets	Carton	Standard Package	NET PRICE PER 100 SETS Less Than 100 Sets	100 to 499 Sets	500 Sets and Over
1941	Single Gang Bridge	3	100 sets	500 sets	$2.05	$1.75	$1.55
1942	Two Gang Bridge	5	100 sets	500 sets	4.10	3.70	3.35

THE M. B. AUSTIN COMPANY

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PACIFIC COAST REPRESENTATIVES
ERNEST F. HAUCK, Chronicle Building, San Francisco 3, Calif.
H. M. POMEROY, 1004 East 4th St., Los Angeles 13, Calif.
W. W. WHEAT, 560 1st Ave., South, Seattle 4, Wash.

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BRUSH KITS OF ALL DESCRIPTIONS
CARBON BRUSHES OF ALL DESCRIPTIONS

HELWIG COMPANY
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611-613 W. Pico Blvd.
Los Angeles 13, Calif. Prospect 2523
1644 Blake Street
Denver 2, Colorado Cherry 4425
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Salt Lake City 3, Utah Telephone: 3-1600

ALL the strength and durability inherent in steel are combined---with definite economies---in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

TRADE *notes*

Gardner Electric Starts New Plant in California

Construction is underway on a new plant for Gardner Electric Mfg. Co. in Emeryville, Calif. Contract was let to Dinwiddie Construction Co. on May 8, and building began on May 13.

Additional real estate was purchased in order to erect a larger factory than the one destroyed by fire on the night of March 15. New buildings will embody the most modern principles of plant design and layout and will consist of several units, each completely fireproof.

Limited production has been started on certain types of transformers, and before the end of the summer, capacity is expected to exceed that of the old plant.

Sterling M. Gardner is president of the firm. David G. Taylor, former secretary, has been elected vice-president and will continue as sales manager. Edward P. Mazzola, electrical engineer, is secretary and Carl R. Fisher is treasurer.

Square D Acquires Site For West Coast Plant

Square D Co. has acquired property in Los Angeles and will build a new West Coast Division plant for manufacture and assembly of electrical control and distribution equipment, Joseph H. Pengilly, vice-president and division manager, has announced.

The new plant will expand by 60% the facilities of the plant now operated. It will be of brick, concrete and steel construction, one story high, and is scheduled for completion as soon as building materials are available under priority regulations. The present Los Angeles plant will be disposed of.

The site is 6¼ acres and is near Southern Pacific railroad facilities. It faces on Valley Blvd., and is bounded by Indiana St., Hatfield Place and Vineburn Ave.

● SEATTLE RADIO SUPPLY Inc. has recently remodeled its quarters and enlarged them to twice former size, at 2117 Second Ave., Seattle. G. A. Reeves is president, and associated with him are Charles Hess as manager of the appliance division and H. I. Pierce as manager of the electronics division. The stock is being departmentalized and the interior made streamlined and modern.

● CAPTAIN ANDREW C. BLUNDELL, recently returned from four year's service with the Army Air Force, has rejoined Maydwell & Hartzell as sales engineer. He will operate out of the Los Angeles office, in the southern California and Arizona territory. Blundell was first commissioned a second lieutenant in 1942. After training in Florida, he was assigned to the Western Flying Training Command, Santa Ana Army Air Base, spent several years there as instructor and squadron commander. He later attended B-29 schools at Amarillo, Texas, and Lowry Field, Colo., then was assigned as flight engineer for B-29's at Roswell Army Air Base, New Mexico.

● SHALLCROSS MFG. CO., Collingdale, Pa., has acquired manufacturing rights and licenses for Variaten attenuators, gain sets and other resistance devices built by the Cinema Engineering Co., Burbank, Calif. Cinema will serve as field engineer for Shallcross on the combined product lines. Change of manufacturing location does not affect engineering and special designing, Shallcross pointed out. This work will continue at Cinema's Burbank laboratories.

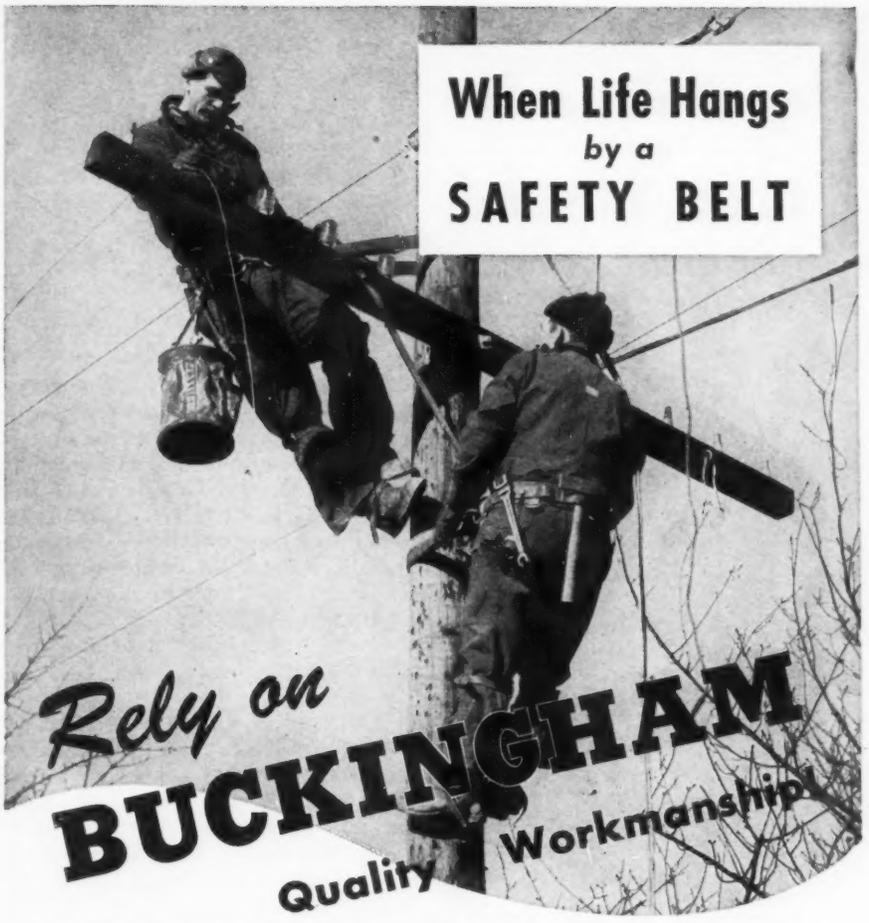
● THE KERITE CO. has appointed Carlo Baldassari as northern California and Northwest representative and Robert A. Young & Co. as southern California and Arizona representative. Baldassari is located in Kerite's San Francisco office at 582 Market St., the Young organization at 714 W. Olympic Blvd., Los Angeles 15.

● W. T. GERMAN, returning from the U. S. Army, decided to go into business for himself and has started United Radio Service at 931 C St., San Diego. German was formerly with Southern California Edison Co. as lighting sales engineer.

● HAROLD FARRIS, formerly general sales manager for Mountain States Power Co. and recently merchandising manager for Stubbs Electric Co., has just been made general manager of Stubbs Electric Co., Portland wholesale house.

● FRANK D. WALLACE, district sales manager for Horton Mfg. Co., moved from the Chamber of Commerce Building, Los Angeles, to the Los Angeles Furniture Mart at 2155 East Seventh St.

● GENERAL ELECTRIC'S advertising and publicity department has moved its Western region office to 850 Russ Bldg., 235 Montgomery St., San Francisco. The office is in charge of F. Lowell Garrison.



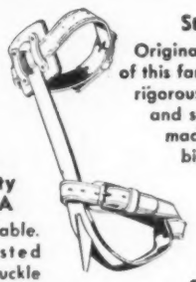
● High in the air . . . haunted by the hazards of carelessness, hot wires, or equipment failures . . . that's when the security of BUCKINGHAM safety equipment eases the physical and mental tension, and enables linesman to do their best work. Fatigue is lessened. Discomfort held at a minimum. And behind it all is a 45-year reputation for quality, workmanship and advanced design that has made Buckingham equipment a favorite all over the United States.

Write for Catalogue 24 showing the complete Buckingham line.

Buckingham distributors in many principal cities

Buckingham Easy Belt No. 58

Floating Feature insures full tool loops under all conditions. No rivet heads or metal contact the body. Made of tan harness leather and lined with soft chrome lace leather.



Stephens Climbers

Originator and sole manufacturer of this famous climber, Buckingham rigorously maintains the quality and safety standards that have made them a favorite with big users for 45 years.

Buckingham Standard Safety Strap No. 42A

Safe and dependable. Drop-forged, tested snaps and buckles. Buckle end reinforced with metal to increase strength and wear. Made from backs of best selected harness leather.

Buckingham Spur Protectors

Keep your spurs sharp and give your climber longer life.

Buckingham MANUFACTURING CO., INC.

Walter E. Crow, President — 5-7 Travis Street, Binghamton, N. Y.

300 Series Paragon Time Switches are well known. They have made friends through dependable performance . . . have done it for over twenty years.

They reduce costs and save valuable man hours through their "Stop Watch" accuracy in controlling ON and OFF time operations on signs, commercial lights, attic fans, stokers, oil burners, blowers, pumps, valves, motors, etc.

Telechron motor operated. Write for complete catalog.

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1616 TWELFTH STREET
TWO RIVERS, WISCONSIN

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72 Marion Street Seattle 4, Washington

Paragon Two Rivers WISCONSIN
BUILDERS OF ELECTRICAL EQUIPMENT SINCE 1905

● BEALL frozen food lockers are now being produced in Portland by the Beall Pipe & Tank Corp. The company has two manufacturing plants, one in Portland, the other in Billings, Mont., with offices and demonstration room at 2101 S.W. Jefferson St., Portland. Sizes range from a 15-cu. ft. locker for the home to a 46-cu. ft. walk-in type. A 9-cu. ft. freezing unit for the small home is also produced. They are distributed in California by Gordon E. Wilkins.

● SWITZER BROTHERS, who started their fluorescent materials business as amateur magicians and students at the University of California and later affiliated with the Continental Lithograph Co. at Cleveland, Ohio, have established their own fluorescent materials business under the name of Glo-Craft at 1220 Huron Road, Cleveland 15. Besides fluorescent lacquer-enamels, they also handle black light and other activating equipment.

● KENNETH B. VAN BERGEN and KENNETH B. REXFORD, both formerly affiliated with Central Electric Co. in San Francisco, recently purchased Yates Co., electrical contracting firm at 22 B St., San Mateo, and will operate it as The Electrical Construction Co. Van Berger was with Central Electric for 16 years as electrical engineer, and Rexford was office manager.

● LEROY H. BENNETT Co., San Francisco, Stewart Distributing Co., Salt Lake City, and Love Electric Co., Seattle, are distributors for Black & White records, produced in Hollywood.

● BEST FLUORESCENT LIGHTING Co., wholesaler of fluorescent lighting and fans, has established two offices, one at 895 Post St., San Francisco, and another at 1839 San Pablo, Oakland. Distribution is wholesale through electrical contractors with a staff of lighting salesmen available to assist contractors in selling and engineering fluorescent lighting installations.

● ROBERT A. YOUNG, associated with Condon & Young, manufacturer's agents, before his entry into the Navy, has returned to the agency business and has opened up offices in Los Angeles at 936 Petroleum Bldg., 714 W. Olympic Blvd. He is representing Kerite wire and cable lines in southern California and Arizona.

ATTENTION, MANUFACTURERS

Do you want competent representation in San Diego by graduate electrical engineer—wide experience design, production and testing of radio, radar, motors, transformers. Established representative handling industrial and commercial electrical and electronic equipment. Write Box 224, Electrical West, 68 Post Street, San Francisco 4, Calif.

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

There is a Tork Clock for every regular switching job; 60 minute, 4 hour or daily cycles.

Bulletins on request

THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.

Western Representatives
L. H. Veale, 445 E. 3rd St.....Los Angeles
Geo. H. Curtiss, 540 McAllister St.....S .F.
H. M. Sayers, 1101 Eastlake Ave.....Seattle
Stevens Sales Co., 41 P.O. Place, Salt Lake
Felix Simon, P.O. Box 614.....Denver
H. Geo. Shefler, P.O. Box 1587.....Phoenix

RELIANCE TIME SWITCHES

10 TO 50 AMP
SINGLE POLE, DOUBLE POLE, TWO CIRCUIT
INDOOR AND OUTDOOR TYPES

A complete line of automatic time switches for practically every installation. Highest quality construction with a record of dependable service for over 35 years. Specify RELIANCE Time Switches and be sure you are specifying the best. Catalog on request.

Represented in the West by

George Kraft Co.
2028 S. W. Yamhill
Portland 5, Ore.

The Ernest L. Wilks Co.
1212 Camp St.
Dallas 2, Tex.

J. J. Perlmuth & Associates
942 Maple Ave.
Los Angeles 15, Calif.

W. E. Young Company
1944 Broadway
Denver, Colo.

Reliance Time Switch Service Co.
3055 Sacramento St., San Francisco, Calif.

RELIANCE AUTOMATIC LIGHTING CO.
1929 MEAD ST., RACINE, WIS.
Manufacturers of
• TIME SWITCHES, TIMERS, TIME DELAY RELAYS •

● FOR THE SECOND CONSECUTIVE YEAR, Newberry Electric Co. of Los Angeles was awarded the Swenson Trophy, Associated General Contractors of America accident prevention award, for 1945. It was pointed out that the company merits special commendation in that it won the award during two war years. During the war the company maintained a peak employment of from 3,500 to 4,000, about 1,200 of them employed in shipyards, where work performed was of extremely hazardous nature. G. E. Arbogast, president, received the award.

● CALIFORNIA ELECTRIC Co., industrial contractor of Oakland, has purchased property to the corner from its present location at 3015 Adeline St., according to C. D. Bronson, president, and will extend its present building 100 ft. to add 8,000 sq. ft. to its present 12,000, for more office space, rearrangement of the stockroom, enlargement of the shop and extension of the yard.

● BROADMOOR ELECTRIC Co. has recently been opened by Harry J. Alfiers and Arthur L. Souza, both former employees of Pacific Electric Motor Co., Oakland. Broadmoor Electric is located at 1966 E. 14th St., San Leandro, and handles electrical appliances as well as doing electrical contracting.

● STEWART-WARNER CORP. has announced a new appointment in the West: The Treasure State Gas & Electric Co., Butte, Mont., radio distributor for Butte, Great Falls and Billings. The San Francisco distributor, Edward F. Hale Co., 925 Harrison St., is expanding into Reno, Nev.

● A. C. SCHWAGER, formerly vice-president and chief engineer of the Pacific Electric Corp., has been made president of the recently incorporated Schwager-Wood Corp., Portland, Ore., specializing in the manufacture of high-voltage airbreak switches.

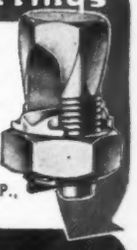
● R. "RUDY" FERDA has resigned as sales manager of Webster Electric Co.'s sound division and will become a manufacturer's agent for radio and electronic lines on the West Coast. He has established temporary headquarters at 7422 Melrose Ave., Hollywood 46.

● TOM DRURY, pioneer electrical contractor of Bakersfield, Calif., has sold his company to N. H. Anderson of San Bernardino. Anderson will operate both his own business in San Bernardino and the Drury Electric Co. in Bakersfield.

● R. W. TULL, manager of Nelson R. Thomas Agency Inc., San Francisco office, announces two new representatives for the company, William A. Shade and Carl F. Underwood. Shade was released from the Army Air Corps after a distinguished record, and Underwood was with American Recording Artists.

● NEEDING more office space, the TRUMBALL ELECTRIC Mfg. Co., San Francisco, has established a downtown office at 1095 Market St. in the Grant Building, in addition to the plant office. Lester Siebert, vice-president, makes his office at the downtown location.

Conductor Fittings



Service Connectors, Lugs, Tees, Grounding Clamps, Straight and Parallel Connectors, Elbows, Cable Taps, etc., etc.

PENN-UNION ELECTRIC CORP., ERIE, PA.

PENN-UNION

Gardner Electric builds new transformer plant for West Coast needs

A larger modern plant, fully equipped to supply transformers to rapidly expanding western electrical industry is being erected on the Emeryville property of Gardner Electric.

Improvements suggested by 37 years of transformer manufacturing experience are incorporated in the new plant. Layout is streamlined to facilitate movement of work to earlier delivery.

Orders on file and those now received are being processed although present production is on limited schedule.

Encouragement and support from loyal customers has fired the enthusiasm of the entire Gardner organization to build for future service.

Gardner Electric Mfg. Co.

EMERYVILLE 8, CALIFORNIA

West Coast Representative

MAYDWELL & HARTZELL INCORPORATED

San Francisco Los Angeles Portland Seattle

INDEX TO ADVERTISERS
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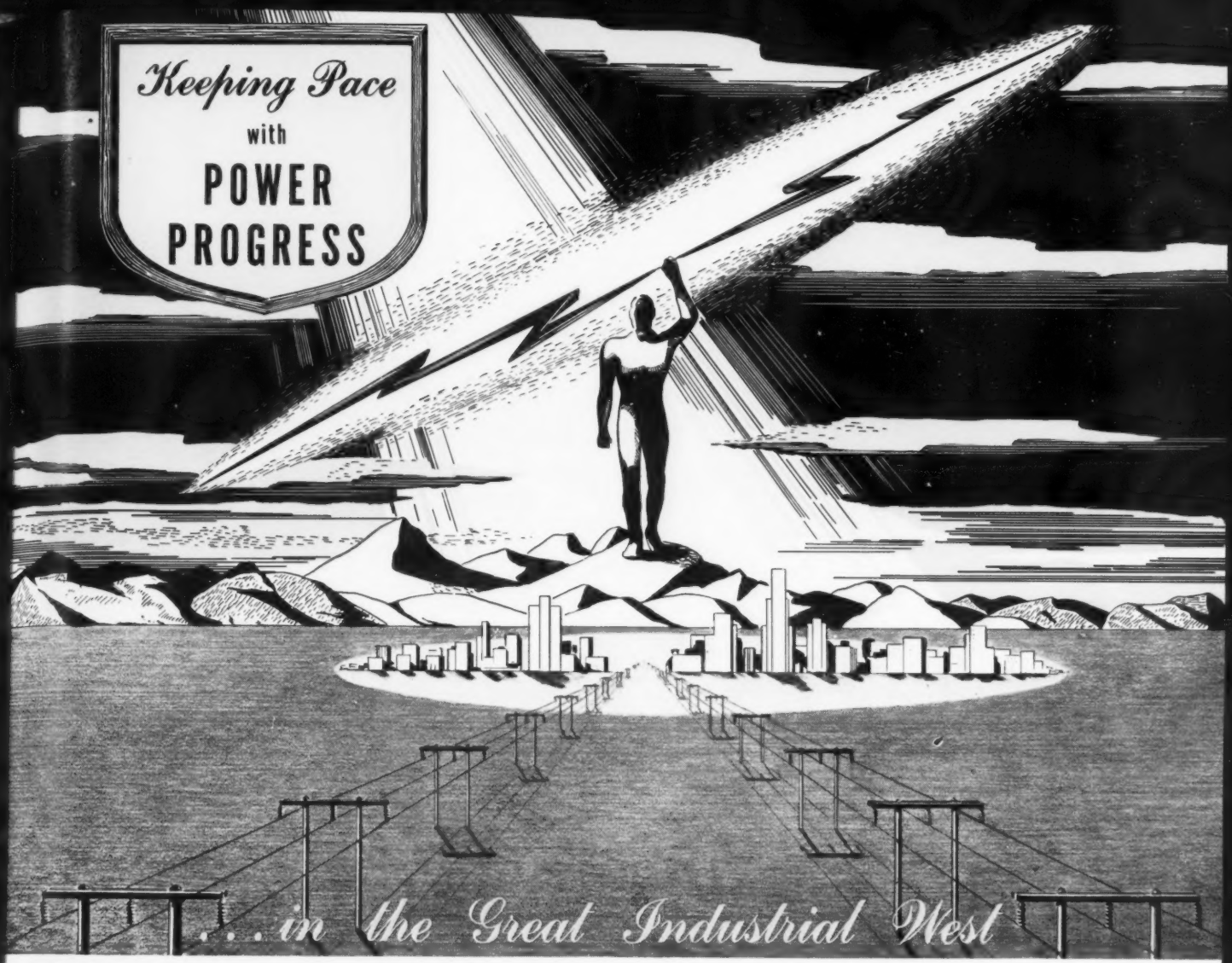
PROFILES *of the month*

Spokesmen for the electric industry at the recent Western food editor's conference in San Francisco were Marguerite Fenner, PG and E home economics director, Julia Kiene, manager, Westinghouse Home Economics Institute, and Elizabeth Woody, director, G-E Consumers Institute. Miss Woody, speaking on frozen foods, asked that emphasis be put on quality to warn the public that for results one must have a good product, properly processed, packaged and stored. Mrs. Kiene pointed out that there is a degree of electrical living for every purse and urged that thinking be in terms of basic requirements so that homes built now will not be substandard in a few years. Miss Fenner explained how a poor utensil can offset advantages of a good range in food preparation

Left: K. K. Knopf, who recently joined the Oliver B. Lyman organization, manufacturers' representatives at San Francisco. Previously Knopf had been with Joshua Hendy at Sunnyvale and he also has served Westinghouse and PG and E

Left below: Tom Perry, Northwestern's new general superintendent, filling the vacancy created by the recent promotion of O. L. LeFever. Perry had been the assistant general superintendent

Below, right: O. L. LeFever, named chief engineer of Northwestern Electric Co. at Portland. He will be in charge of all expansion and improvement on system



. . . SPEEDING RECONVERSION

Through the war years the Electrical Power Industry accomplished outstanding achievements, in the face of seemingly insurmountable difficulties. Girded with the responsibility of speeding conversion from War to Peacetime living, the Power Utilities are making rapid strides in extending their facilities to serve the expanded needs of the West's Great Industrial Empire. To keep pace with this *Progress of Power*, required foresight and careful planning. In consequence, Hubbard's greatly expanded Pacific Coast Plant is meeting the increased demand for *dependable quality* Pole-Line Hardware. You can rely on Hubbard and Company, for your requirements, now and in the future.

HUBBARD POLE LINE

Hardware includes:

- ★ STANDARD POLE LINE HARDWARE
- ★ CABLE MATERIAL FOR OVERHEAD AND UNDERGROUND CONSTRUCTION
- ★ COMMUNICATION SYSTEM HARDWARE
- ★ ELECTRIC RAILWAY HARDWARE
- ★ INSULATOR PINS
- ★ POLE TOP FIXTURES AND STEEL CROSS ARMS
- ★ STRAIN INSULATORS AND CLEVISES
- ★ HIGH TENSION MATERIAL
- ★ SECONDARY RACKS AND ACCESSORIES
- ★ POLE AND CROSS ARM BRACKETS
- ★ WIREHOLDERS AND HOUSE BRACKETS
- ★ EXPANSION BOLTS
- ★ STREET LIGHTING EQUIPMENT
- ★ LIGHTNING ARRESTORS
- ★ RURAL ELECTRIFICATION MATERIAL

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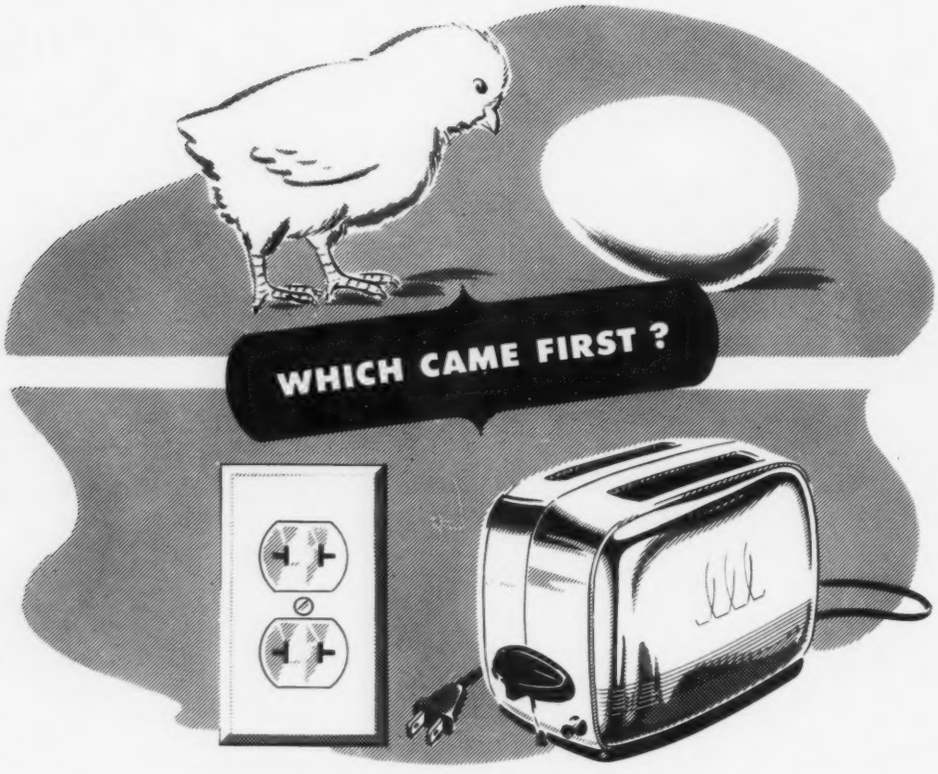
HANG THE LOAD ON HUBBARD HARDWARE



Sell Wiring First

There is still some argument about the chicken and the egg, but there can be none about the electrical outlet and the electrical appliance. There must be an outlet, or the appliance is useless! A majority of today's homes cannot take *full* advantage of modern electrical aids to better living because their wiring fails to provide enough outlets and sufficiently heavy wire.

The only sound way the electrical industry can build toward a maximum market for appliances is to modernize wiring in existing homes, and to see that new homes are properly wired to begin with. Sell good wiring *first* and good appliance sales will follow.

PACIFIC COAST ELECTRICAL ASSOCIATION

601 W. FIFTH ST., LOS ANGELES 13, CALIFORNIA • 447 SUTTER ST., SAN FRANCISCO 8, CALIFORNIA